

BULLETIN
of **CARNEGIE MUSEUM OF NATURAL HISTORY**

THE PALEOGENE MAMMALS OF CHINA

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Dedicated to:

- Dr. Minchen M. Chow, our professor, who is the founder in China of the study of Paleogene mammals;
- Our colleagues of the Laboratory of Paleomammalogy of IVPP, who devote labor in this field;
- Our American colleagues, who have helped us so eagerly and have been so friendly.

CONTENTS

Preface	9
Introduction	11
Acknowledgments	12
Chapter 1. The Chinese Paleogene Mammalian Faunas	
Section 1. Paleocene	
I. Guang-dong (Kwantung) Province	
1. Nan-xiong (Nanhsiung) Basin	13
II. Jiang-xi (Kiangsi) Province	
2. Chi-jiang (Chihkiang) Basin	14
III. Hu-nan Province	
3. Cha-ling Basin	17
IV. An-hui (Anhui) Province	
4. Qian-shan (Chienshan) Basin	17
5. Xuan-cheng (Hsuancheng) Basin	20
V. He-nan (Honan) Province	
6. Tan-tou Basin	20
VI. Shaan-xi (Shensi) Province	
7. Shi-men Basin	20
VII. Xin-jiang (Sinkiang) Region	
8. Turpan (Turfan) Basin	20
VIII. Nei-mong-gol (Inner Mongolia) Region	
9. Nao-mu-gen (Nomogen) Area	21
Table 1. A comparative table of the Nao-mu-gen, Bayan Ulan, Gashato, and Naran Bulak faunas	22
Table 2. An analyzed table of Chinese Paleocene mammals	23
Section 2. Eocene	
I. Nei-mong-gol (Inner Mongolia) Region	
1. Bayan Ulan Formation	22
2. Arshanto Formation	22
3. Irдин Manha Formation:	
3A. Irдин Manha Area	24
3B. Camp Margetts Area	25
3C. Shara Murun Area	26
4. Shara Murun Formation	27
Table 3. A comparison of the fossils from the Irдин Manha Formation and Shara Murun Formation	29
II. Xin-jiang (Sinkiang) Region	
5. Turpan (Turfan) Basin	28
6. Jung-gur (Dzungar) Basin	30
III. Shaan-xi (Shensi) Province	
7. Lan-tian District	30
IV. Bei-jing (Peking) and He-bei (Hopei) Province	
8. Chang-xin-dian (Changsintien) Locality	30
9. Ling-shan Locality	30
V. Shan-dong (Shantung) Province	
10. Wu-tu Basin	30
11. Niu-shan Basin	30
12. Xin-tai (Sintai) Basin	31
VI. Shan-xi (Shansi) Province	
13. Yuan-chu Basin	31

VII. He-nan (Honan) Province	
14. Tan-tou Basin	33
15. Ji-yuan (Chiyuan) Basin	33
16. Ling-bao Basin	33
17. Lu-shi Basin	34
18. Wu-cheng Basin	34
19. Xi-chuan (Sichuan) Basin	36
VIII. Hu-bei (Hupei) Province	
20. Jun-xian Basin	37
21. Yi-chang (Ichang) District	37
IX. An-hui (Anhui) Province	
22. Lai-an Basin	37
X. Jiang-xi (Kiangsi) Province	
23. Chi-jiang (Chihkiang) Basin	38
24. Yuan-shui Basin	38
XI. Hu-nan (Hunan) Province	
25. Heng-yang Basin	38
XII. Guang-xi (Kwangsi) Region	
26. Bo-se (Bai-se) Basin	40
XIII. Yun-nan (Yunnan) Province	
27. Lu-nan Basin	41
28. Li-jiang Basin	43
Section 3. Oligocene	
I. Nei-mong-gol (Inner Mongolia) Region	
1. Shara Murun-Irdin Manha Area	44
1A. Ulan Gochu and Urtyn Obo Formation	44
1B. Houldjin Formation	44
Table 4. The list of the mammalian fauna of Hsanda Gol Formation (Middle Oligocene), Mongolia	46
Table 5. The list of the mammalian fauna of Ardyn Obo Formation (Early Oligocene), Mongolia	47
2. Deng-kou (Saint Jacques) Area	45
3. Hos Burd (Suhaitu) Basin	45
II. Ning-xia (Ningsia) Region	
4. Ling-wu Basin	47
5. Others	48
III. Xin-jiang (Sinkiang) Region	
6. Turpan (Turfan) Basin	48
7. Ha-mi Basin	48
8. Jung-gur (Dzungar) Basin	48
IV. Gan-su (Kansu) Province	
9. Taben buluk Area	48
10. Shargaltein Gol Area	49
11. Shih-ehr-ma-cheng Locality	50
V. Shaan-xi (Shensi) Province	
12. Lan-tian District	50
VI. Shan-xi (Shansi) Province	
13. Yuan-chu Basin	50
VII. Guang-xi (Kwangsi) Region	
14. Bo-se Basin	50
15. Yong-le Basin	50
VIII. Gui-zhou (Kweichow) Province	51

IX. Yun-nan Province	
16. Qu-jing (Chu-ching) Basin	51
17. Lu-nan Basin	51
18. Luo-ping Basin	51
Chapter 2. The Systematic and Stratigraphic Distribution of Chinese Paleogene Mammals	52
Chapter 3. The Index	
I. Systematic index	65
II. Stratigraphic formation index	76
Chapter 4. The Bibliography	78
Appendix I. Comparative list of Chinese authors' names in English and Pinyin	86
Appendix II. Comparative table of the localities in "Conventional English" or Wade-giles and Pinyin	87
Appendix III. Map of Chinese Paleogene mammalian fossil localities	95
Appendix IV. A tentative correlation of the Chinese Paleogene formations containing mammalian fossils	97

PREFACE

Fossil mammals from China have been known to science for well over one hundred years. British explorers found Late Quaternary mammals in a locality at Niti Pass in southern Tibet, which were illustrated by Falconer and Cautley in *Fauna Antiqua Sivalensis* (1845) and later (1868) described by Falconer. Some other early publications on Chinese fossil mammals, such as those by Owen (1870) and Koken (1885), were based on Late Tertiary and Quaternary materials purchased from Chinese drug stores. Although there were other important works on Chinese fossil mammals in the early part of the 1900s, most notably Schlosser's (1903) *Die fossilen Säugetiere Chinas*, it was not until the 1920s when field projects by a number of different groups, including the Geological Survey of China, the Central Asiatic Expedition of the American Museum of Natural History, and paleontologists from Munich, Upsala, and Paris, led to a great expansion in knowledge of the Chinese record. The first Paleogene mammals of China were discovered by the Central Asiatic Expedition and reported by Matthew and Osborn.

In 1942 Teilhard de Chardin and Leroy summarized the Chinese record that had been published up to the end of 1941. At about that time world events interfered with the regular development of paleontology in China (as well as elsewhere) but by 1950 Chinese mammalian paleontologists were back at work under the auspices of the Cenozoic Laboratory of the Ministry of Geology. Their work, in the organization that later became known as the Institute of Vertebrate Paleontology and Paleoanthropology of the Academia Sinica, was under the inspired and dedicated leadership of Chung-chien Young until his death in 1979, when our esteemed colleague Minchen Chow undertook the direction of the Institute. Under these two eminent directors, the paleontologists of the IVPP have greatly expanded the Chinese record for the entire Cenozoic. Perhaps most noteworthy, however, has been the growth of knowledge of the Paleogene, which was very poorly known even in 1940 when Teilhard de Chardin and Leroy could report only various Late Eocene localities in Inner Mongolia as representing the Paleogene within the boundaries of China. In

the 40 years since Teilhard de Chardin and Leroy's report, a succession of Paleocene faunas have been described, the Eocene record has been filled in, and the Oligocene faunas have become better known. The record is a fascinating and significant one, bearing not only such groups as the endemic but highly important Anagalida but also various perissodactyls, condylarths, and others that facilitate intercontinental correlations. Unfortunately for those paleontologists without a knowledge of the Chinese language, however, much of the literature on these faunas has been published in Chinese alone or with only short summaries in another language. Locality and stratigraphic information is scattered throughout the Chinese literature and it has been difficult to obtain a comprehensive understanding of stratigraphic relationships for the Chinese materials. Fortunately this paper will do much to remedy this situation so far as the Paleogene is concerned.

It came about as a result of the coincidentally concordant visits to the United States of two competent specialists in the Chinese Paleogene, Chuan-kuei Li (to Carnegie Museum of Natural History) and Su-yin Ting (to Louisiana State University). These scholars were inundated with requests from American and western European colleagues for information on Chinese Paleogene mammals, on locality and stratigraphic relationships. Our ignorance made the need for some sort of summary work very apparent. Li and Ting took time from their busy schedules and their own research projects to provide this masterly summary. It is patterned on Teilhard de Chardin and Leroy's arrangement, but goes much further, especially with details of localities and with carefully executed maps. It illustrates not only the comprehensive knowledge of these two colleagues but also the tremendous advances resulting from the work of all our colleagues at the IVPP during the past 40 years.

We at Carnegie Museum of Natural History are proud to make this summary available in the certainty that it will greatly improve understanding of the Chinese Early Tertiary and will stimulate further research in mammalian paleontology.

Mary R. Dawson

INTRODUCTION

Our best opening to this review of Chinese Paleogene mammals turns back the pages of history to the words, "Our knowledge of Chinese fossil mammals has been advancing rapidly since 1920 . . ." from the book "Chinese Fossil Mammals" published by Pierre Teilhard de Chardin and Pierre Leroy in 1942. From his experience of working with Chinese fossil mammals for twenty years and his wide paleontological knowledge, Teilhard de Chardin reviewed evidence on the fossil mammalian faunas of Eastern Asia that had been published up to the 1940s, presenting it in a synoptic form helpful to further scientific progress.

Looking back upon the progress of the past nearly forty years since Teilhard de Chardin's work, some important breakthroughs and exciting discoveries have occurred in China, especially with respect to Early Tertiary mammals.

The most highly significant advance that should be emphasized is the discovery of an essentially complete stratigraphic sequence of Paleocene age, containing three or four mammalian assemblages, or faunal zones. Not only has it broadened our knowledge of mammalian faunas and their geological distribution in Paleocene time, but also with its high numbers, rich diversity, and specific endemic color, it has given rise to some speculations about the origin and migration of mammals at the beginning of the age of mammals.

Mammalian faunas of Eocene age were documented earlier, but were largely limited to the later Eocene. Great progress has been made on the previously little known Middle Eocene faunas and on Early Eocene faunas, which were entirely unknown in Teilhard de Chardin's time. Most notably, the discovery of fossils of *Homogalax*, *Heptodon*, *Coryphodon*, and *Hyopsodus*, all typical of the North American Early Eocene (Wasatchian), are of considerable stratigraphic and zoogeographic significance.

Mammalian faunas of Oligocene age were much less common than those of the Eocene, but large collections have been found recently.

At the time of this writing, more than 300 genera and 560 species from the Chinese Paleogene have been reported. The great number of new collections found in China, the hundreds of new publications on these finds, and especially the visit to the U.S.

of a Chinese delegation of vertebrate paleontologists and the paper, "The Mammal-bearing Early Tertiary Horizons of China", by Chow and Zheng (1980), strongly attracted the attention of many foreign colleagues and friends. Although our foreign colleagues have difficulty discussing and exchanging information because of the language barrier, they are eager to know and understand the advances in Chinese vertebrate paleontology and discuss them.

We have been deeply impressed by the enthusiastic reception of Chinese progress in vertebrate paleontology from foreign colleagues. As Chinese vertebrate paleontologists, we would like to make more readily available the newest advances in the study of Chinese Paleogene mammals, results of the devoted labors of our teacher and colleagues, to our foreign friends, even though it is very difficult for us to make it as complete as we would like to because of the limitations of our knowledge thus far. By writing this paper we would also like to give thanks to our American colleagues for receiving and helping us so eagerly.

We realize that some mistakes and omissions are unavoidable, no matter how diligently we checked this work. We would greatly appreciate corrections and constructive criticism of our work.

We have gathered together material on Chinese Paleogene mammals published up to the end of 1980 in this synopsis. The catalogue is divided into the following four parts:

Chapter 1. "The Chinese Paleogene Mammalian Fauna" is the main body of this work. In order to give our reader a somewhat generalized but clear conception of each fossil site and fauna, we divide the chapter into three sections, Paleogene, Eocene, and Oligocene, and give the details from each basin. The history, location, dimensions, stratigraphic sequence, and list of mammalian fauna were given as completely as possible for each site. By using the coordinate system and providing translated maps, we have made it possible for the reader to get an idea of the location. In some cases, we have used the coordinates of nearby counties or towns instead of small localities when we could not get their definite coordinates. Using basically G. G. Simpson's classification, we have listed the mammalian fauna. Also we respect the original author's idea about the classification for the fossils studied by him (her). To

check fossils conveniently with the original author's localities and reports, we add their field number and reference literature number following each fossil.

Chapter 2, "The Systematic and Stratigraphic Distribution of Chinese Paleogene Mammals".

Chapter 3, "The Index" includes both systematic and stratigraphic indexes.

Chapter 4 is a bibliography. About 280 papers are listed in the bibliography. More than 60 percent of them (170 papers) were completed by Chinese colleagues and mostly published in Chinese with or

without an English summary. So we give the note "in Chinese" or "In Chinese with English summary" after each Chinese publication, so that the reader can quickly determine whether or not translation is worthwhile.

We have four special appendices at the end of the paper, a comparative list of Chinese authors' names, a list of fossil localities in English and Pinyin, a map of 61 localities of Chinese Paleogene mammals, and a tentative correlation of the Chinese Paleogene formations.

ACKNOWLEDGMENTS

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CHAPTER 1 — THE CHINESE PALEOGENE MAMMALIAN FAUNAS

Section 1. Paleocene

I. Guang-dong (Kwantung) Province

1. Nan-xiong (Nanhsiung) Basin

Young Chung-chien and Chow Min-chen, 1962⁽²³⁴⁾¹

Chang Yu-ping and Tung Yung-sheng, 1963⁽¹³⁾

Tang Xin and Chow Min-chen, 1964⁽¹⁷¹⁾

Chen Chia-chien, Tang Ying-jun, Chiu Chan-siang, and Yeh Hsiang-kuei, 1973⁽¹⁴⁾

Zhou Ming-zhen, Zhang Yu-ping, Wang Ban-yue, and Ding Su-yin, 1977⁽²⁵⁹⁾

South China "Redbeds" Research Group, IVPP, 1977⁽¹⁶⁴⁾

a. Location: Nan-xiong County, Guang-dong Province.

Coordinates: 25°00'–25°10'N; 114°15'–114°30'E; 25°07'N; 114°18'E (Nan-xiong city)

(Fig. 1)

b. Dimensions: 80 km long (NE–SW), 18 km wide (at maximum).

c. Stratigraphic Sequence:

Dan-xia Formation (Eocene)

Dark red sandy-conglomerate rock, sandy mudstone and sandstone (100–550 m)².

—?Conformity—

Nung-shan Formation (Late Paleocene) (200 m)

Da-tang Member: Purplish dusky red marly sandstone and sandy marls with intercalating greyish green sandy marls [73139, 73138, 73059]³.

Zhu-gui-keng Member: Greyish green and purplish red silt mudstone [73143] (etc.).

—Conformity or Disconformity—

Shang-hu Formation (Early-Middle Paleocene)

Purplish red marls and mudstone with intercalated thin sandstone and conglomerates [6217, 6219e, 6233, 63081, 63082, 63084, 63087, 63088, 73057, 73150].

—Disconformity—

Nan-xiong Group (Late Cretaceous).

d. The list of the mammalian fauna:

Nung-shan Formation (Late Paleocene)

Da-tang Member:

Order Edentata Cuvier, 1798

Family Ernanodontidae Ding, 1979

Ernanodon antelios Ding, 1979⁽⁷²⁾ [73139]

Order Primates Linnaeus, 1758

Family Adapidae Trouessart, 1879

Petrolemur brevirostre Tong, 1979⁽¹⁸³⁾ [73059]

Order Anagalida Szalay and McKenna, 1971

Family Anagalidae Simpson, 1931

cf. *Huaiyangale leura* Ding and Tong, 1979⁽⁷³⁾ [73138.c]

Family Pseudictopidae Sulimski, 1968

Haltictops mirabilis Ding and Tong, 1979⁽⁷³⁾ [73138.c]

Haltictops meilingensis Ding and Tong, 1979⁽⁷³⁾ [73059.c]

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

Yantanglestes datangensis (Wang, 1976)⁽¹⁹⁴⁾⁽⁹⁷⁾ [73059.d]

Order Notoungulata Roth, 1903

Family Arctostylopidae Schlosser, 1923

Arctostylopidae gen. et sp. nov.⁽¹⁶⁴⁾

Order Pantodonta Cope, 1873

Family Archaeolambdidae Flerov, 1952

Archaeolambdidae gen. et spp. nov.⁽¹⁶⁴⁾

Family Pastoralodontidae Chow and Qi, 1978

Altilambda pactus Chow and Wang, 1978⁽⁵⁸⁾ [73138]

Family Phenacolphidae Zhang, 1978

Minchenella grandis Zhang, 1978⁽²⁴³⁾⁽²⁴⁶⁾ [73059.b]

Yuelophus validus Zhang, 1978⁽²⁴³⁾ [73138.d]

Zhu-gui-keng Member:

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

?*Pachyaena* sp.⁽¹⁹⁴⁾ [73143]

Order Pantodonta Cope, 1873

Family Archaeolambdidae Flerov, 1952

Archaeolambdidae gen. et spp. nov.⁽¹⁶⁴⁾

Family Phenacolphidae Zhang, 1978

Phenacolphidae gen. et sp. nov.⁽¹⁶⁴⁾

Shang-hu Formation (Early-Middle Paleocene)

Order Anagalida Szalay and McKenna, 1971

Family Anagalidae Simpson, 1931

Linnania lofoensis Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [63081]

Order Carnivora Bowdich, 1821

Family Miacidae Cope, 1880

Pappictidops acies Wang, 1978⁽¹⁹⁵⁾ [73057.a]

Pappictidops obtusus Wang, 1978⁽¹⁹⁵⁾ [73057.b]

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

Yantanglestes feiganensis (Chow et al., 1973)⁽⁴³⁾⁽²⁵⁹⁾⁽⁹⁷⁾ [6233]

Dissacusium shanghoensis Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [63087]

Hukoutherium ambigum Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [63082]

Family Hyopsodontidae Lydekker, 1889

Yuodon protoselenoides Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [63087]

Palasiodon siurenensis Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [6217]

¹ The number in parentheses refers to the paper listed in Chapter 4 (The Bibliography) in which the appropriate fossils and/or stratigraphy are described and discussed.

² The thickness of the formation in meters.

³ The numbers in brackets are the main field numbers of the IVPP.

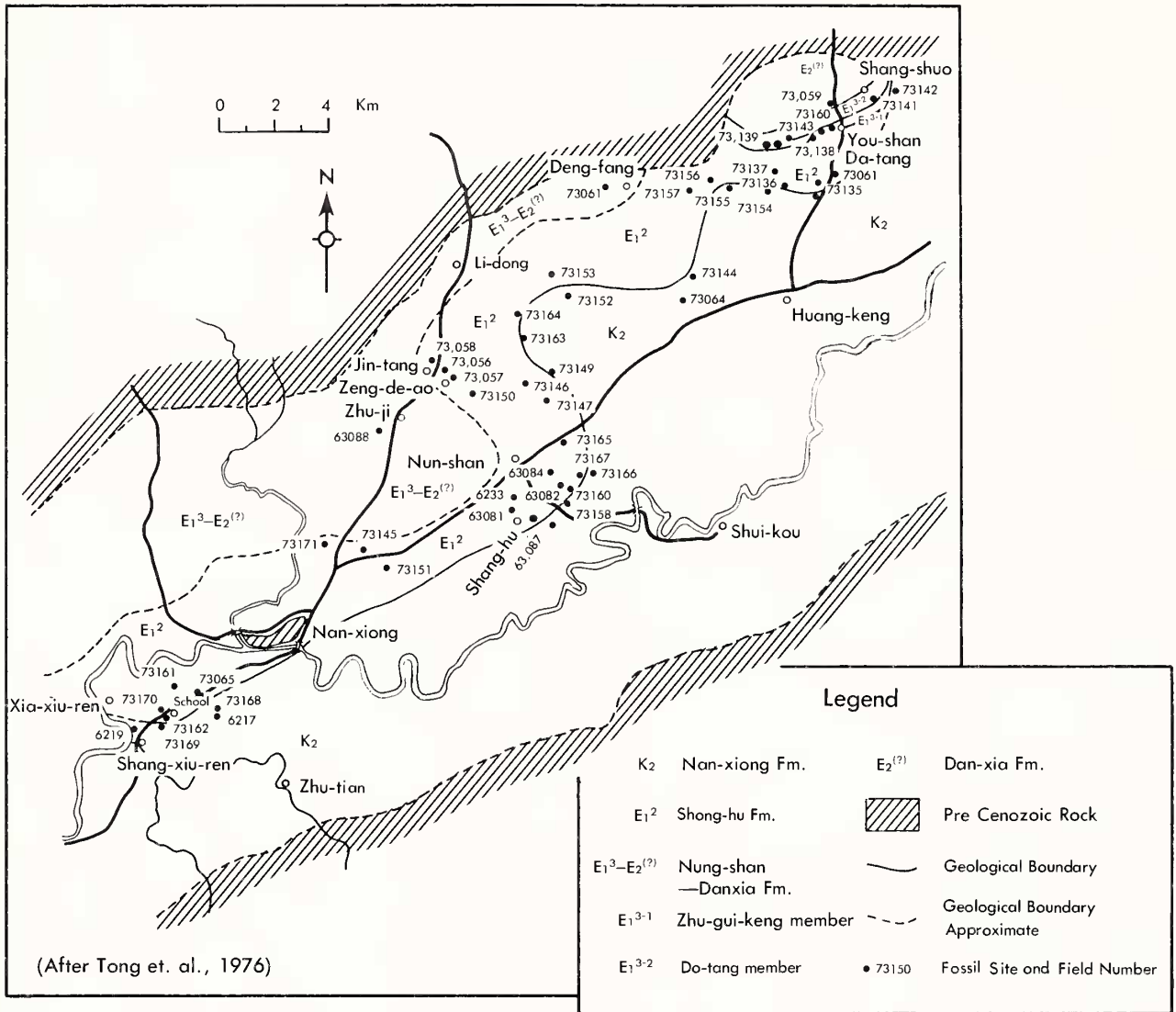


Fig. 1.—Map of the Paleocene mammalian fossil localities of Nanxiong Basin.

- Family Periptychidae Cope, 1882
- ?Ectoconus sp.⁽⁴³⁾⁽²⁵⁹⁾ [63084]
- Order Tillodontia Marsh, 1875
- Family Esthonychidae Cope, 1883
- Lofochaius brachyodus Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ (Zeng-de-ao)
- Order ?Tillodontia Marsh, 1875
- Family incertae sedis
- Dysnoetodon minuta Zhang, 1980⁽²⁴⁵⁾ [73150]
- Order Pantodonta Cope, 1873
- Family Bemalambidae Chow et al., 1973
- Bemalambda nanhsiungensis Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [63084]
- Bemalambda pachyoesteus Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [62.19e]

- Bemalambda crassa Chow et al., 1973⁽⁴³⁾⁽²⁵⁹⁾ [63088]
- Bemalambda sp.⁽⁴³⁾⁽²⁵⁹⁾ [63087]
- II. Jiang-xi (Kiangsi) Province
- 2. Chi-jiang (Chihkiang) Basin
- Tang Xin and Chow Min-chen, 1964⁽¹⁷¹⁾
- Zheng Jia-jian, Tong Yong-sheng, Ji Hong-xiang, and Zhang Fa, 1973⁽²⁵⁶⁾
- Tong Young-sheng, Zhang Yu-ping, Wang Ban-yue, and Ding Su-yin, 1976⁽¹⁹⁰⁾
- South China "Redbeds" Research Group, IVPP, 1977⁽¹⁶⁴⁾
- Tong Young-sheng, Zhang Yu-ping, Zheng Jia-jian, Wang Ban-yue, and Ding Su-yin, 1979⁽¹⁹¹⁾
- a. Location: Da-yu and Nan-kang counties, Jiang-xi Province.

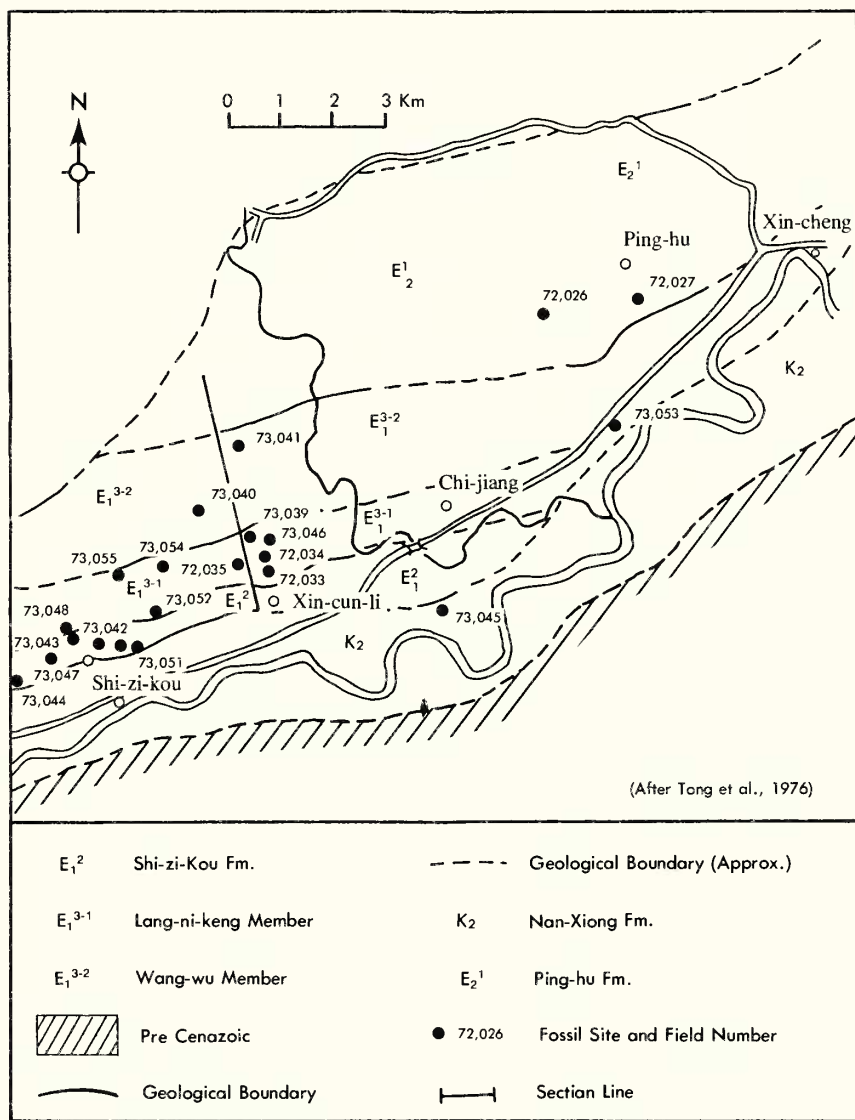


Fig. 2.—Map of the Late Cretaceous and Lower Tertiary vertebrate fossil localities of Chijiang Basin.

Coordinates: 25°23'–25°40'N; 114°20'–114°45'E;
25°29'N; 114°34'E (Chi-jiang town)

(Fig. 2)

b. Dimensions: 40 km long (NE–SW), 10 km wide (at maximum).

c. Stratigraphic Sequence:

Ping-hu Formation (Early Eocene)

Purplish red pelitic sandstone and marls with intercalating yellowish green siltstone [72027], (200–300 m).

—Conformity—

Chi-jiang Formation (Late Paleocene) (473 m)

Wang-wu Member: Purplish red marls with intercalating red sandstone and green thin calcareous mudstone [73041].

Lang-ni-keng Member: Purplish red mudstone with intercalating dusky red and greyish green sand-conglomerates [72034, 72035, 73039, 73046, 73048, 73052, 73055].

—Disconformity—

Shi-zi-kou Formation (Early Middle Paleocene)

Brick-red sandy marls with intercalating greyish green sandstone [73042, 73043].

—Disconformity—

Nan-xiong Group (Late Cretaceous)

d. The list of the mammalian fauna:

Chi-jiang Formation (Late Paleocene)

Wang-wu Member:

Order Notoungulata Roth, 1903

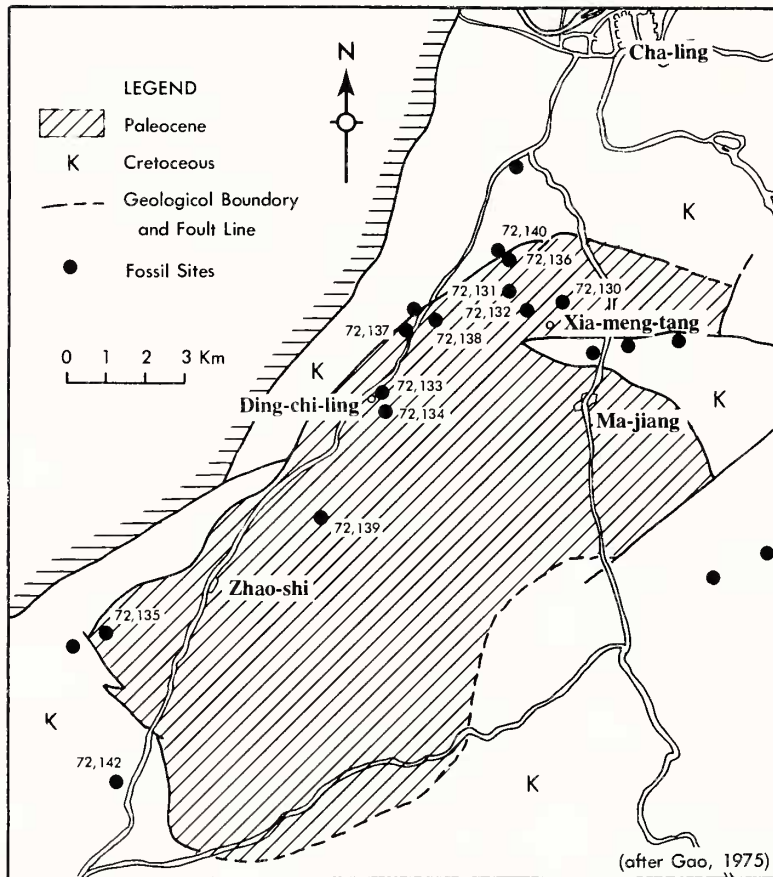


Fig. 3.—Map of the Paleocene fossil localities of Chaling Basin.

- Family Arctostylopidae Schlosser, 1923
Allostylops periconotus Zheng, 1979⁽²⁵²⁾
 [73041]
- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
Jiangxia chaotoensis Zhang, Zheng, and
 Ding, 1979⁽²⁴⁸⁾ [73041.1]
- Order Pantodonta Cope, 1873
 Family Archaeolambdidae Flerov, 1952
Archaeolambda sp.⁽¹⁸⁴⁾ [73041]
- Lan-ni-keng Member:
- Order Insectivora Bowdich, 1821
 Insectivora gen. et sp. indet. 1979⁽⁷⁴⁾ [73052]
- Order Anagalida Szalay and McKenna, 1971
 Family Anagalidae Simpson, 1931
Hsiuannania minor Ding and Zhang,
 1979⁽⁷⁴⁾ [73055]
- Family Pseudictopidae Sulimski, 1968
 cf. *Pseudictops tenuis* Ding and Zhang,
 1979⁽⁷⁴⁾ [73046]
- Order Notoungulata Roth, 1903
 Family Arctostylopidae Schlosser, 1923
Asiostylops spanios Zheng, 1979⁽²⁵²⁾ [73039]
- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
 ?*Hapalodectes* sp.⁽²⁴⁸⁾ [73048]
- Family Hyopsodontidae indet.
 Hyopsodontidae indet.⁽²⁴⁸⁾ [73052]
- Family Peritychidae Cope, 1882
Pseudanisonchus antelios Zhang, Zheng,
 and Ding, 1979⁽²⁴⁸⁾ [73039]
- Order Pantodonta Cope, 1873
 Family Archaeolambdidae Flerov, 1952
Archaeolambda cf. *planicanina* Flerov,
 1952⁽¹⁸⁴⁾⁽²⁷²⁾ [73039]
Archaeolambda dayuensis Tong, 1979⁽¹⁸⁴⁾
 [72034]
Nanlingilambda chijiangensis Tong,
 1979⁽¹⁸⁴⁾
- Family Harpyodidae Wang, 1979
Harpyodus decorus Wang, 1979⁽¹⁹⁷⁾
 [73048.b]
- Family Phenacolphidae Zhang, 1978
Ganolophus lanikenensis Zhang, 1979⁽²⁴⁴⁾
 [72035]
- Mammalia, Order indet.
 Family Didymoconidae Kretzoi, 1943
Archaeoryctes notialis Zheng, 1979⁽²⁵¹⁾
 [72035]
- Shi-zi-kou Formation (Early Middle Paleocene)
 Order Pantodonta Cope, 1873
 Family Bemalambdidae Chow et al., 1973

Bemalambda shizikouensis Wang and Ding,
1979⁽¹⁹⁸⁾ [73043, 73042.b]

Family Archaeolambdidae Flerov, 1952
Archaeolambdidae indet.⁽¹⁸⁴⁾ [73042]

III. Hu-nan Province

3. Cha-ling Basin

Tang Xin and Chow Min-chen, 1964⁽¹⁷¹⁾

Gao Hung-Hsiang, 1975⁽⁷⁷⁾

Wang Ban-yue, 1975⁽¹⁹³⁾

South China "Redbeds" Research Group, IVPP,
1977⁽¹⁶⁴⁾

a. Location: Cha-ling County, Hu-nan Province.

Coordinates: 26°38'–26°48'N; 113°24'–113°34'E;
26°48'N; 113°33'E (Cha-ling city)
(Fig. 3)

b. Dimensions: 90 km long (NNE–SSW), 24 km wide (at maximum) (Meso-Cenozoic Basin).

c. Stratigraphic Sequence:

Zao-shi Formation (Early Middle Paleocene)

Purplish red sandy claystone with intercalating
conglomerate, gypsum, and greyish green
marls [72137, 72139, 72135, 72130, 72136,
72133, 72132] (more than 53 m).

—Disconformity—

Dai-jia-ping Formation (Late Cretaceous)

d. The list of the mammalian fauna:

Zao-shi Formation (Early-Middle Paleocene)

Order Anagalida Szalay and McKenna, 1971

Family Anagalidae Simpson, 1931

Stenanagale xiangensis Wang, 1975⁽¹⁹³⁾
[72137]

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

?*Dissacus rotundus* Wang, 1975⁽¹⁹³⁾ [72139]

Order Tillodontia Marsh, 1875

Family Esthonychidae Cope, 1883

Meiostylodon zaoshiensis Wang, 1975⁽¹⁹³⁾
[72135]

Order Pantodonta Cope, 1873

Family Bemalambdidae Chow et al., 1973

Bemalambda nanhsiungensis Chow et al.,
1975⁽¹⁹³⁾ [72139]

Bemalambdidae indet.⁽¹⁹³⁾ [72139, 72130,
72136]

Hypsilolambda chalingensis Wang, 1975⁽¹⁹³⁾
[72133]

Hypsilolambda impensa Wang, 1975⁽¹⁹³⁾
[72132]

Hypsilolambda spp.⁽¹⁹³⁾ [72130]

Mammalia indet.⁽¹⁹³⁾ [72133, 72130]

IV. An-hui (Anhui) Province

4. Qian-shan (Chienshan) Basin

Qiu Zhan-xiang and Li Chuan-kuei, 1972⁽¹⁵¹⁾

Qiu Zhan-xiang, Li Chuan-kuei, Huang Xue-shi,
Tang Ying-jun, Xu Qin-qi, Yen De-fa, and Zhang
Hong, 1977⁽¹⁵³⁾

a. Location: Qian-shan and Huai-ning counties, An- hui Province.

Coordinates: 30°35'–30°45'N; 116°28'–116°38'E;
30°36'N; 116°36'E (Qian-shan city)

(Fig. 4)

b. Stratigraphic Sequence:

Dou-mu Formation (Late Paleocene) (600 m)

Upper Member: Thick purplish red conglomerates
interbedding with sandstone and conglom-
eratic sandstone [71017].

Lower Member: Thick purplish red medium-fine
sandstone with intercalating thin conglom-
erates and silt mudstone [71015, 71079].

—Unconformity—

Wang-hu-dun Formation (Early-Middle Paleocene)
(1,800 m)

Upper Member: Purplish red fine sandstones with
intercalating thin greyish white sandstone
[70020, 70022, 71008, 71009, 71010, 71012,
71016, 71075].

Middle Member: Purplish red conglomerates and
conglomeratic gritstones interbedding with
fine sandstone.

Lower Member: Purplish red middle-fine sand-
stone with intercalating conglomerates and
greyish white arkose-sandstone [71001, 71002,
71004, 71005, 71006].

Wang-he Formation (Late Cretaceous)—(750 m)

c. The list of the mammalian fauna:

Dou-mu Formation (Late Paleocene)

Upper Member:

Order Insectivora Bowdich, 1821

Family Indet.

Hyracolestes ermineus Matthew and Gran-
ger, 1925⁽¹⁵²⁾⁽¹²⁹⁾ [71017]

Order Anagalida Szalay and McKenna, 1971

Family Anagalidae Simpson, 1931

Hsiuannania sp.⁽²⁰⁸⁾ [71017]

Family Eurymylidae Matthew, Granger, and
Simpson, 1929

Heomys orientalis Li, 1977⁽¹⁰⁹⁾ [71017]

Eurymyloidea indet.⁽¹⁰⁹⁾ [71017]

Family Mimotonidae Li, 1977

Mimotona wana Li, 1977⁽¹⁰⁹⁾ [71017]

Order Notoungulata Roth, 1903

Family Arctostylopidae Schiösser, 1923

Sinostylops promissus Tang and Yan,
1976⁽¹⁷⁵⁾ [71017]

Order Pantodonta Cope, 1873

Family Archaeolambdidae Flerov, 1952

Archaeolambda tabiensis Huang, 1977⁽⁹⁵⁾
[71017]

Lower Member:

Order Anagalida Szalay and McKenna, 1971

Family Anagalidae Simpson, 1931

Hsiuannania tabiensis Xu, 1976⁽²⁰⁸⁾ [71079]

Family Mimotonidae Li, 1977

Mimotona robusta Li, 1977⁽¹⁰⁹⁾ [71079]

Family Pseudictopidae Sulimski, 1968

Allictops inserrata Qiu, 1977⁽¹⁵⁰⁾ [71015]

Mammalia, Order indet.

Obtusodon hanhuensis Xu, 1977⁽²¹⁰⁾
[71079]

Wang-hu-dun Formation (Early-Middle Paleocene)

Upper Member:

Order Anagalida Szalay and McKenna, 1971

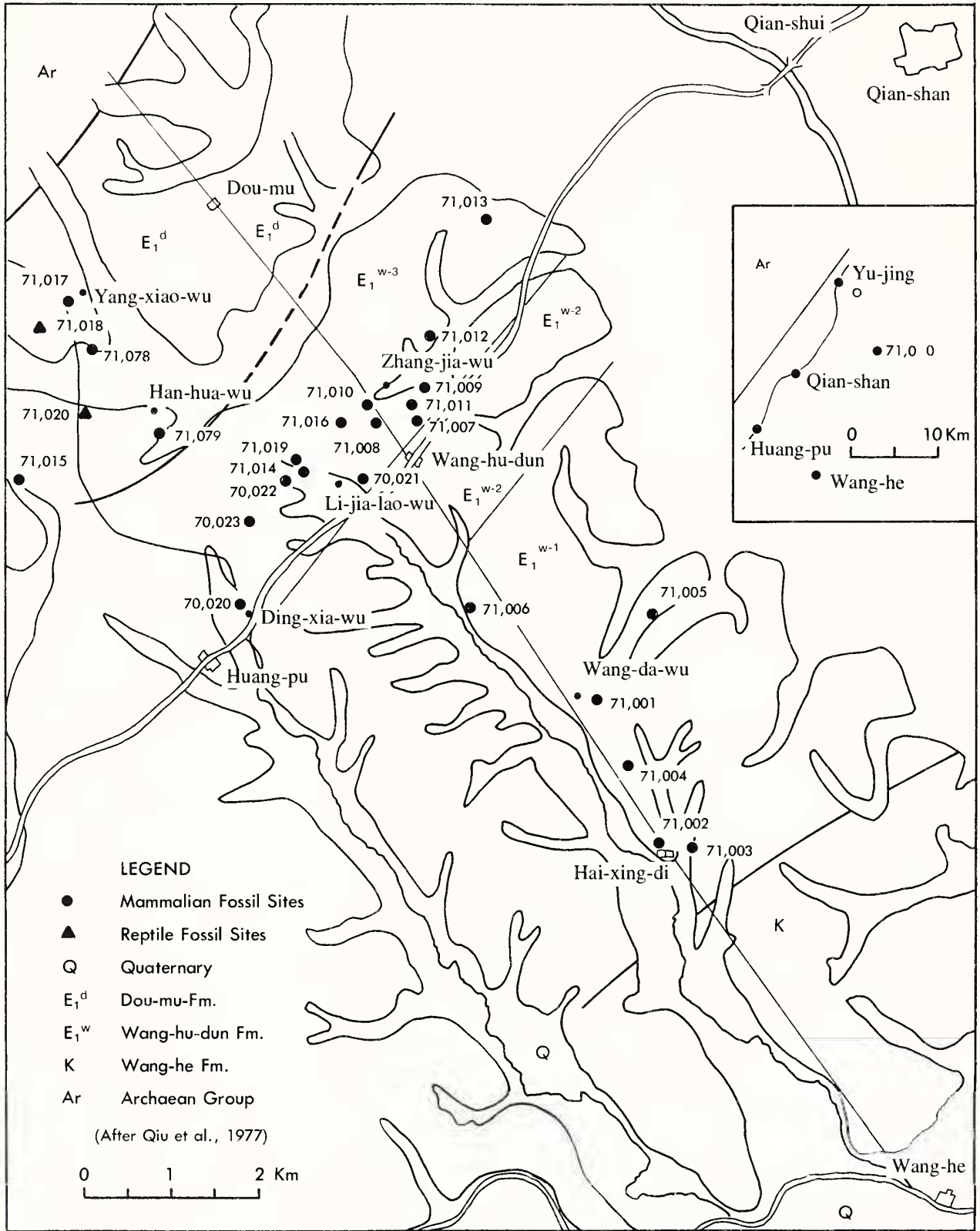


Fig. 4.—Map of the Paleocene fossil localities of Qianshan Basin.

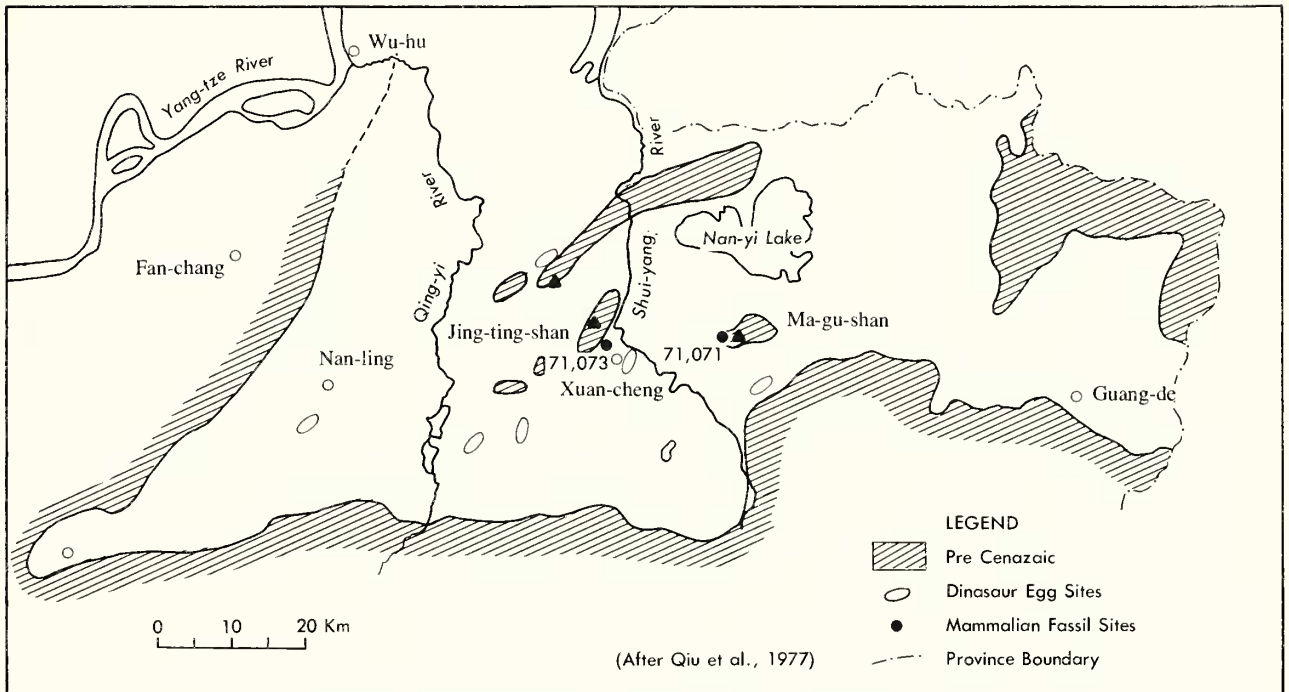


Fig. 5.—Map of the vertebrate fossil localities of Xuan-cheng Basin.

- Family Anagalidae Simpson, 1931
Huaiyangale chianshanensis Xu, 1976⁽²⁰⁸⁾ [70020]
Huaiyangale sp.⁽²⁰⁸⁾ [70020]
Diacronus wanguhuensis Xu, 1976⁽²⁰⁹⁾ [71016]
Diacronus anhuiensis Xu, 1976⁽²⁰⁹⁾ [71009]
 Family Eurymylidae Matthew, Granger, and Simpson, 1929
Heomys sp.⁽¹⁰⁹⁾ [71010]
 Family Mimotonidae Li, 1977
Mimotona wana Li, 1977⁽¹⁰⁹⁾ [71016]
Mimotona sp.⁽¹⁰⁹⁾ [71008]
 Family Pseudictopidae Sulimski, 1968
Anictops tabiepedis Qiu, 1977⁽¹⁵⁰⁾ [71008, 71011, 70021, etc.]
Anictops aff. *tabiepedis* Qiu, 1977⁽¹⁵⁰⁾ [70022]
Paranictops majuscula Qiu, 1977⁽¹⁵⁰⁾ [70022]
 ?*Paranictops* sp.⁽¹⁵⁰⁾ [71014]
 Order Carnivora Bowdich, 1821
 Family Miacidae Cope, 1880
Pappictidops orientalis Qiu and Li, 1977⁽¹⁵²⁾ [71008]
 Order Condylarthra Cope, 1881
 Family Hyopsodontidae Lydekker, 1889
Decoredon elongetus Xu, 1977⁽²¹⁰⁾ [71009]
 Order Pantodonta Cope, 1873
 Family Pastoralodontidae Chow and Qi, 1978
Altilambda pactus Chow and Wang, 1978⁽⁵⁸⁾ [71075]
Altilambda tenuis Chow and Wang, 1978⁽⁵⁸⁾ [71016]
 Family Harpyodidae Wang, 1979
Harpyodus euros Qiu and Li, 1977⁽¹⁵²⁾ [71012]
 Mammalia, Order indet.
 Family Didymoconidae Kretzoi, 1943
Zeuchtherium niteles Tang and Yan, 1976⁽¹⁷⁵⁾ [71009]
 Mammalia, Order indet.
Obtusodon hanhuaensis Xu, 1977⁽²¹⁰⁾ [70020]
 Lower Member:
 Order Anagalida Szalay and McKenna, 1971
 Family Zalambdalestidae Gregory and Simpson, 1926
Anchilestes impolitus Qiu and Li, 1977⁽¹⁵²⁾ [71001]
 Family Anagalidae Simpson, 1931
Wanogale hodungensis Xu, 1976⁽²⁰⁹⁾ [71001]
Anaptogale wanghoensis Xu, 1976⁽²⁰⁹⁾⁽¹⁸³⁾ [71001]
Chianshaniania gianghuaiensis Xu, 1976⁽²⁰⁹⁾ [71001]
 Family Pseudictopidae Sulimski, 1968
Cartictops canina Ding and Tong, 1979⁽¹⁵⁰⁾⁽¹⁵²⁾⁽⁷³⁾ [71005]
Anictops tabiepedis Qiu, 1977⁽¹⁵⁰⁾ [71001]
Paranictops sp.⁽¹⁵⁰⁾ [71005]
 Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875

- Yantanglestes (Lestes) conenxus* Yan and Tang, 1976⁽²²³⁾⁽⁹⁷⁾ [71006]
 Order Pantodonta Cope, 1873
 Family Bemalambdidae Chow et al., 1973
Bemalambda sp.⁽⁹⁶⁾ [71001]
 Bemalambdidae indet.⁽⁹⁶⁾ [71002]
5. Xuan-cheng (Hsuancheng) Basin
 Qiu Zhan-xiang and Li Chuan-kuei, 1972⁽¹⁵¹⁾
 Qiu Zhan-xiang, Li Chuan-kuei, Huang Xue-shi, Tang Ying-jun, Xu Qin-qi, Yan De-fa, and Zhang Hong, 1977⁽¹⁵³⁾
- a. Location: Xuan-cheng and Guang-de counties, Anhui Province.
 Coordinates: 30°58'N; 118°45'E (Xuan-cheng city) (Fig. 5)
- b. Stratigraphic Sequence:
 Shuang-ta-si Group (Late Paleocene)
 Purplish red silt mudstones and marls with intercalating conglomerates and lime nodules [71071, 71073] (213–760 m).
 —Unconformity—
 Xuan-nan Formation (Late Cretaceous)
- c. The list of the mammalian fauna:
 Shuang-ta-si Group (Late Paleocene)
 Order Anagalida Szalay and McKenna, 1971
 Family Anagalidae Simpson, 1931
Hsiuannania maguensis Xu, 1976⁽²⁰⁸⁾ [71071]
 Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
Dissacus magushanensis Yan and Tang, 1976⁽²²³⁾ [71071]
 Order Notoungulata Roth, 1903
 Family Arctostylopidae Schlosser, 1923
Sinostylops progressus Tang and Yan, 1976⁽¹⁷⁵⁾ [71071]
 Order Pantodonta Cope, 1873
 Family Archaeolambdidae Flerov, 1952
Archaeolambda yangtzeensis Huang, 1978⁽⁹⁶⁾ [71073]
 Mammalia, Order indet.
 Family indet.
Wanotherium xuanchengensis Tang and Yan, 1976⁽¹⁷⁵⁾ [71073]
- V. He-nan (Honan) Province
6. Tan-tou Basin
 Tong Yong-sheng and Wang Jing-wen, 1979⁽¹⁸⁷⁾⁽¹⁸⁸⁾
 Tong Yong-sheng and Wang Jing-wen, 1980⁽¹⁸⁹⁾
- a. Location: Luan-chuan County, He-nan Province.
 Coordinates: 34°00'N; 111°46'E (Tan-tou town)
- b. Stratigraphic Sequence:
 Tan-tou Formation (Early Eocene)
 Greyish green and greyish white mudstones interbedding with greyish black marls and kerogen shales (136–458 m).
 Da-zhang Formation (Late Paleocene)
 Dark red and greyish green mudstones interbedding with greyish white marls (104–375 m).
 —Conformity—
 Gao-yu-gou Formation (Middle Paleocene)
- Purplish red mudstones with intercalating conglomerate and greyish green silt band (302–366 m).
 —Disconformity—
 Qiu-ba Formation (Late Cretaceous)
- c. The list of the mammalian fauna:
 Da-zhang Formation (Late Paleocene)
 Order Anagalida Szalay and McKenna, 1971
 Family Pseudictopidae Sulimski, 1968
 Pseudictopidae indet.⁽¹⁸⁹⁾
 Order Pantodonta Cope, 1873
 Family Pastoralodontidae Chow and Qi, 1978
 Pastoralodontidae indet.⁽¹⁸⁹⁾
 Gao-yu-gou Formation (Middle Paleocene)
 Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
 Mesonychidae indet.⁽¹⁸⁹⁾
 Order Pantodonta Cope, 1873
 Family Bemalambdidae Chow et al., 1973
 Bemalambdidae indet.⁽¹⁸⁹⁾
- VI. Shaan-xi (Shensi) Province
7. Shi-men Basin
 Xue Xiang-xi, 1978⁽²²²⁾
- a. Location: Luo-nan County, Shaan-xi Province.
 Coordinates: 34°06'N; 110°10'E (Luo-nan city)
- b. Stratigraphic Sequence:
 Red sandy mudstones (Paleocene)
- c. The list of the mammalian fauna:
 Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
 Mesonychidae indet.⁽²²²⁾
 Order Pantodonta Cope, 1873
 Family Bemalambdidae Chow et al., 1973
 Bemalambdidae indet.⁽²²²⁾
- VII. Xin-jiang (Sinkiang) Region
8. Turpan (Turfan) Basin
 Chow Min-chen, 1960⁽³²⁾⁽³³⁾
 Zhai Ren-jie, Zheng Jia-jian, and Tong Yong-sheng, 1978⁽²⁴¹⁾
 Tong Yong-sheng, 1978⁽¹⁸²⁾
- a. Location: Turpan and Shan-shan counties, Xin-jiang.
 Coordinates: 42°45'–43°12'N; 89°05'–91°36'E; 42°52'N; 90°10'E (Shan-shan city) (Fig. 6)
- b. Dimensions: about 200 km (E–W), 50 km (N–S) (Cenozoic exposure area).
- c. Stratigraphic Sequence:
 Tai-zi-cun Formation (Late Paleocene)
 Purplish and brownish red arenaceous mudstone with intercalating greyish-green, fine sandstone and marls [64021, 64022, 64031, 66013] (65 m).
 —Disconformity—
 Su-ba-shi Formation (Late Cretaceous)
- d. The list of the mammalian fauna:
 Tai-zi-cun Formation (Late Paleocene)
 Order Multituberculata Cope, 1884
 Multituberculata indet.⁽¹⁸²⁾ [64022]
 Order Anagalida Szalay and McKenna, 1971

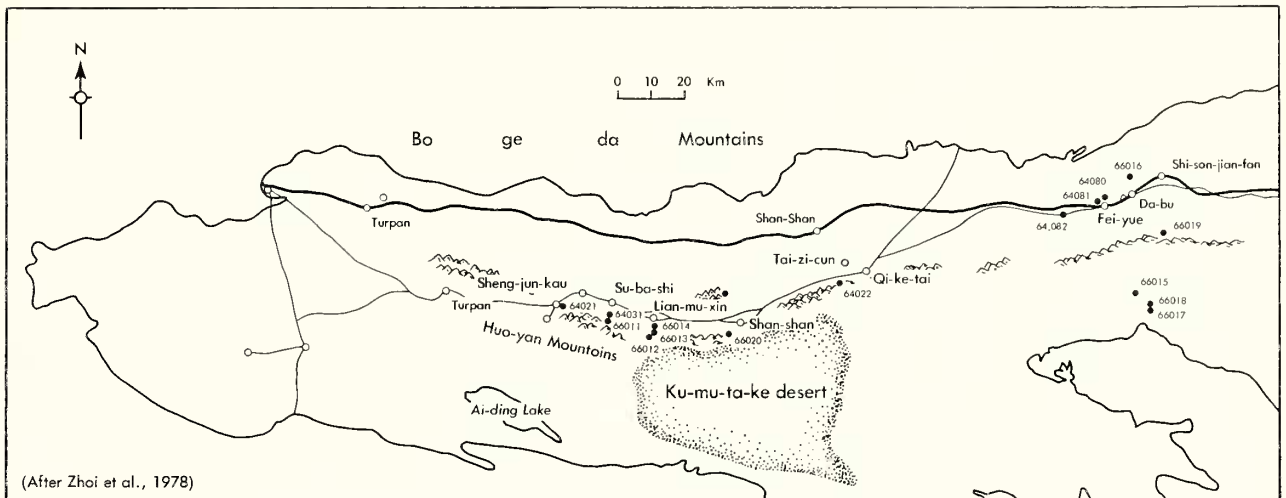


Fig. 6.—Map of the Lower Tertiary mammalian fossil localities of Turpan Basin.

- Family Eurymylidae Matthew, Granger, and Simpson, 1929
 ?Eurymylidae gen. et sp. nov., 1978⁽¹⁸²⁾ [66013-2]
- Family Pseudictopidae Sulimski, 1968
Pseudictops chaii Tong, 1978⁽¹⁸²⁾ [66013]
- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
 Mesonychidae indet.⁽¹⁸²⁾ [64021-5]
- Order Pantodonta Cope, 1873
 Family Archaeolambdidae Flerov, 1952
Archaeolambda cf. planicanina Flerov, 1952⁽¹⁸²⁾⁽²⁷²⁾ [64031]
- Family Pantolambdodontidae Granger and Gregory, 1934
Dilambda speciosa Tong, 1978⁽¹⁸²⁾ [66013-1]
- Family Phenacolophidae Zhang, 1978
Tienshanilophus subashiensis Tong, 1978⁽¹⁸²⁾⁽²⁴³⁾ [64031]
Tienshanilophus lianmuqinensis Tong, 1978⁽¹⁸²⁾⁽²⁴³⁾ [66013-3]
Tienshanilophus shengjinkouensis Tong, 1978⁽¹⁸²⁾⁽²⁴³⁾ [64021]
- Order Dinocerata Marsh, 1873
 Family Uintatheriidae Flower, 1876
Prodinoceras dionicus Tong, 1978⁽¹⁸²⁾ [66013-4]
Jiaoluootherium turfanense (Chow) Tong, 1978⁽¹⁸²⁾⁽³³⁾⁽³²⁾ [64022]
Houyanotherium primigenum Tong, 1978⁽¹⁸²⁾ [64021]
Houyanotherium simplum Tong, 1978⁽¹⁸²⁾ [66013-6]
- VIII. Nei-mong-gol (Inner Mongolia) Region
 9. Nao-mu-gen (Nomogen) Area
 Zhou Min-zhen, Qi Tao and Li Yong, 1976⁽⁵⁴⁾
 Chow Min-chen and Qi Tao, 1978⁽⁵³⁾
 a. Location: Formerly Nom Khong Shireh or Nomo-gen Ora (see Fig. 7) Si-zi-wang Qi, Inner Mongolia. Coordinates: around 43°00'N; 111°30'E
 b. Stratigraphic Sequence:
 Nao-mu-gen Formation (Late Paleocene)
 Dark red and greyish green argillaceous sandstone, and dark red sand clay (8 m visible thickness).
 c. The list of the mammalian fauna:
 Nao-mu-gen Formation (Late Paleocene)
 Order Multituberculata Cope, 1884
 Family Taeniolabididae Granger and Simpson, 1929
Prionessus lucifer Matthew and Granger, 1925⁽⁵³⁾⁽¹²¹⁾
Sphenopsalis nobilis Matthew, Granger, and Simpson, 1928⁽⁵³⁾⁽¹²⁸⁾
 Family Lambdopsalidae Chow and Qi, 1978
Lambdopsalis bulla Chow and Qi, 1978⁽⁵³⁾
 Order Insectivora Bowdich, 1821
 Family Deltatheridiidae Gregory and Simpson, 1926
Sarcodon pygmaeus Matthew and Granger, 1925⁽⁵³⁾⁽¹²¹⁾
 Order Anagalida Szalay and McKenna, 1971
 Family Mimotoniidae Li, 1977
Mimotona borealis Chow and Qi, 1977⁽⁵³⁾
 Family Pseudictopidae Sulimski, 1968
Pseudictops lophiodon Matthew, Granger, and Simpson, 1929⁽⁵³⁾⁽¹²⁹⁾
 Order ?Rodentia
 Rodentia indet.⁽⁵³⁾
 Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
 ?*Dissacus* sp.⁽⁵³⁾
Plagiocristodon serratus Chow and Qi, 1978⁽⁵³⁾
 Order Notoungulata Roth, 1903
 Family Arctostylopidae Schlosser, 1923
Paleostylops iturus Matthew and Granger, 1925⁽⁵³⁾⁽¹²¹⁾

Table 1.—A comparative table of the Nao-mu-gen, Bayan Ulan, Gashato, and Naran Bulak faunas.

Taxa	Faunas			
	Gashato	Naran Bulak	Nomo-gen	Bayan Ulan
<i>Prionessus lucifer</i> M. et G.	+	?	+	+
<i>Sphenopsalis nobilis</i> M. et al.	+	-	+	-
<i>Lambdopsalis bulla</i> C. et Q.	-	-	+	-
<i>Hyracolestes ermineus</i> M. et G.	+	-	-	-
<i>Sarcodon pygmaeus</i> M. et G.	+	-	+	-
<i>Praolestes nanus</i> M. et G.	+	-	-	-
<i>Altanius orlovi</i> D. et M.	-	+	-	-
<i>Eurymylus laticeps</i> M. et G.	+	+	-	-
<i>Mimotona borealis</i> C. et Q.	-	-	+	+
<i>Gomphos elkema</i> Sh.	+	-	-	-
<i>Pseudictops lophiodon</i> M. et G.	+	+	+	+
<i>Khashanagale zofiae</i> S. et M.	+	-	-	-
? <i>Khashanagale</i> sp. nov. (S. et M.)	+	-	-	-
? <i>Dissacus</i> sp. 1	+	-	-	-
? <i>Dissacus</i> sp. 2	-	-	+	-
<i>Pachyaena</i> sp.	-	+	-	+
<i>Plagiocristodon serratus</i> C. et Q.	-	-	+	+
<i>Phenacolophus fallax</i> M. et G.	+	-	-	-
<i>Archaeolambda planicanina</i> F.	-	+	-	-
<i>Pastoralodon lacustris</i> C. et Q.	-	-	+	+
<i>Convallisodon convexus</i> C. et Q.	-	-	+	-
<i>Convallisodon haliutensis</i> C. et Q.	-	-	+	-
<i>Prodinoceras martyr</i> M. et G.	+	-	-	-
<i>Mongolotherium efremovi</i> F.	-	+	-	+
<i>Mongolotherium plantigradum</i> F.	-	+	-	-
<i>Pyrodon</i> sp.	-	-	-	+
<i>Palaeostylops iturus</i> M. et G.	+	+	+	+
<i>Palaeostylops macrodon</i> M. et al.	+	+	+	+
<i>Lambdaotherium</i> sp.?	-	-	-	+
? <i>Heptodon</i> sp.?	-	-	-	+
<i>Hyracotherium gabuniaei</i> D.	-	+	-	-
Rodentia indet.?	-	-	+	-
Total number of taxa	15	10	14	12

Paleostylops macrodon Matthew, Granger, and Simpson, 1929⁽⁵³⁾⁽¹²⁹⁾
Order Pantodonta Cope, 1873
Family Pastoralodontidae Chow and Qi, 1978
Pastoralodon lacustris Chow and Qi, 1978⁽⁵³⁾
Convallisodon convexus Chow and Qi, 1978⁽⁵³⁾
Convallisodon haliutensis Chow and Qi, 1978⁽⁵³⁾

Section 2. Eocene

1. Nei-mong-gol (Inner Mongolia) Region

1. Bayan Ulan Formation (Early Eocene)

Qi Tao, 1979⁽¹⁴⁷⁾Chow Min-chen and Zheng Jia-jian, 1980⁽⁶⁴⁾

a. Location: Southwest of Camp Margetts, Camp Margetts Area, or about 20 km east of the Ai-li-ge-miao.

Coordinates: around 43°20'N; 111°45'E

b. Stratigraphic Sequence: unpublished; thickness 7 m.

c. The list of the mammalian fauna:

Bayan Ulan Formation (Early Eocene)

Order Multituberculata Cope, 1884

Family Taeniolabididae Granger and Simpson, 1929

Prionessus lucifer Matthew and Granger, 1925⁽¹⁴⁷⁾⁽¹²¹⁾

Order Anagalida Szalay and McKenna, 1971

Family Mimotonidae Li, 1977

Mimotona borealis Chow and Qi, 1978⁽¹⁴⁷⁾⁽⁵³⁾

Family Pseudictopidae Sulimski, 1968

Pseudictops lophiodon Matthew, Granger, and Simpson, 1929⁽¹⁴⁷⁾⁽¹²⁹⁾

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

Pachyaena sp.⁽¹⁴⁷⁾*Plagiocristodon serratus* Chow and Qi, 1978⁽¹⁴⁷⁾⁽⁵³⁾

Order Notoungulata Roth, 1903

Family Arctostylopidae Schlosser, 1923

Palaeostylops iturus Matthew and Granger, 1925⁽¹⁴⁷⁾⁽¹²¹⁾*Palaeostylops macrodon* Matthew, Granger, and Simpson, 1929⁽¹⁴⁷⁾⁽¹²⁹⁾

Order Pantodonta Cope, 1873

Family Pastoralodontidae Chow and Qi, 1978

Pastoralodon lacustris (?) Chow and Qi, 1978⁽¹⁴⁷⁾⁽⁵³⁾

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

Mongolotherium efremovi Flerov, 1957⁽¹⁴⁷⁾⁽²⁷¹⁾*Pyrodon* sp.⁽¹⁴⁷⁾⁽²³⁷⁾

Order Perissodactyla Owen, 1848

Family Brontotheriidae Marsh, 1873

? *Lambdaotherium* sp.⁽¹⁴⁷⁾

Family Helaeletidae Osborn, 1892

? *Heptodon* sp.⁽¹⁴⁷⁾

2. Arshanto Formation (Middle Eocene)

Berkey, C. P., and F. K. Morris, 1927⁽⁴⁾Radinsky, L. B., 1974⁽¹⁵⁷⁾Chow Min-chen, Qi Tao and Li Yong, 1976⁽⁵⁴⁾Qi Tao, 1979⁽¹⁴⁷⁾Qi Tao, 1980⁽¹⁴⁸⁾

a. Location: About 20 miles south-southeast of Iren Dabasu, a mile east of Irдин Manha type locality. Coordinates: around 43°30'N; 112°15'E (Fig. 7)

b. Stratigraphic Sequence: "prevailing red clays and fine silts."

c. The list of the mammalian fauna:

Order Perissodactyla Owen, 1848

Family Lophialetidae Matthew and Granger, 1925

Schlosseria magister Matthew and Granger, 1926⁽¹²⁷⁾⁽¹⁵⁸⁾

In 1977 about 40 species of fossil mammals, including a diversity of perissodactyls, were collected by Qi Tao from the Arshanto Formation. Most of the materials have not been published

Table 2.—An analyzed table of Chinese Paleocene mammals (*E*—early; *M*—middle; *L*—late).

Taxa	Basin or area										Total	
	Nan-xiong (Nanhsiung)		Chi-jiang (Chikiang)		Qian-shan (Chienshan)		Cha-ling	Xuan-cheng (Hsuancheng)	Nao-mu-gen	Turpan (Turfan)		
	E.	L.	E.	L.	E.	L.	E.-M.	L.	L.	L.		
Multituberculata	—	—	—	—	—	—	—	—	—	3	1	4
Insectivora	—	—	—	1	—	1	—	—	—	1	—	3
?Primates	—	1	—	—	—	—	—	—	—	—	—	1
Anagalidae	1	1	—	1	6	2	1	1	—	—	—	13
Pseudictopidae	—	2	—	1	5	1	—	—	—	1	1	11
Eurymylidae	—	—	—	—	2	3	—	—	—	1	1	7
Zalambdalestidae	—	—	—	—	1	—	—	—	—	—	—	1
Didymoconidae	—	—	—	1	1	—	—	—	—	—	—	2
Mesonychidae	3	2	—	2	1	—	1	1	2	2	1	13
Condylarthra	3	—	—	2	—	—	—	—	—	—	—	5
Edentata	—	1	—	—	—	—	—	—	—	—	—	1
Notoungulata	—	1	—	2	—	1	—	—	1	2	—	7
Carnivora	2	—	—	—	1	—	—	—	—	—	—	3
Tillodontia	2	—	—	—	—	—	1	—	—	—	—	3
Phenacolphidae	—	3	—	1	—	—	—	—	—	—	3	7
Pantodonta	3	3	2	5	5	1	6	1	3	2	2	31
Dinocerata	—	—	—	—	—	—	—	—	—	—	4	4
Others	—	—	—	—	2	1	1	1	1	—	—	6
Total	14	14	2	16	24	10	10	5	14	13	13	122

1. Numbers of species, calculated up to the end of 1980.

2. Anagalida = 26%; Pantodonta = 25%; Condylarthra = 15% (percentage calculated as ratio of number of species of each order to total number of species).

yet, but Qi (1979)⁽¹⁴⁷⁾ tentatively gave the following list:

Order Insectivora Bowdich, 1821

gen. et sp. nov. [*Sinosinopa sinensis*]⁽¹⁴⁷⁾⁴

Order Rodentia Bowdich, 1821

paramyid gen. et sp. nov. [*Asiamys medius*]⁽¹⁴⁷⁾

Tamquammys wilsoni Dawson, Li, and Qi, in press [*Maodengomys youngi*]⁽¹⁴⁷⁾⁽⁷⁰⁾

Order Carnivora Bowdich, 1821

gen. et sp. indet.⁽¹⁴⁷⁾

Order Condylarthra Cope, 1881

Mongolonyx sp. nov. [*Mongolonyx prominentis*]⁽¹⁴⁷⁾

?*Mesonyx* sp. nov. [*Mesonyx obtusidens*]⁽¹⁴⁷⁾

Order Tillodontia Marsh, 1875

gen. et sp. nov. [*Ulanius chowi*]⁽¹⁴⁷⁾

Order Pantodonta Cope, 1873

Coryphodontidae, gen. et sp. nov. [*Metacoryphodon luminis*]⁽¹⁴⁷⁾

Coryphodontidae, gen. et sp. nov. [*?Metacoryphodon minor*]⁽¹⁴⁷⁾

?*Pantolambdodon* sp. nov. [*Pantolambdodon minor*]⁽¹⁴⁷⁾

Order Dinocerata Marsh, 1873

Gobiatherium mirificum Osborn and Granger, 1934⁽¹⁴⁷⁾⁽¹⁴²⁾

Gobiatherium sp. nov. [*Gobiatherium major*]⁽¹⁴⁷⁾

Gobiatherium sp. nov. [*Gobiatherium monolabotum*]⁽¹⁴⁷⁾

Order Perissodactyla Owen, 1848

Hyrachyus sp. nov. [*Hyrachyus neimongoliensis*]⁽¹⁴⁷⁾

Hyrachyus sp. nov. [*Hyrachyus crista*]⁽¹⁴⁷⁾

Hyrachyus sp. nov. [*Hyrachyus medius*]⁽¹⁴⁷⁾

Hyrachyus sp. nov. [*?Hyrachyus minor*]⁽¹⁴⁷⁾

Colodon cf. *inceptus*⁽¹⁴⁷⁾

Tapiroidea gen. et sp. nov. [*Euryletes magnus*]⁽¹⁴⁷⁾

Tapiroidea gen. et sp. nov. [*Euryletes minimus*]⁽¹⁴⁷⁾

Tapiroidea gen. et sp. nov. [*Euryletes medius*]⁽¹⁴⁷⁾

Schlosseria magister Matthew and Granger, 1926⁽¹²⁷⁾⁽¹⁴⁷⁾

Schlosseria sp. nov. [*Schlosseria dimera*]⁽¹⁴⁷⁾

Schlosseria sp. nov. [*Schlosseria masculus*]⁽¹⁴⁷⁾

⁴ The new genus and species names placed between brackets are provisional and may be subject to revision; thus they cannot yet be introduced into the scientific nomenclature.

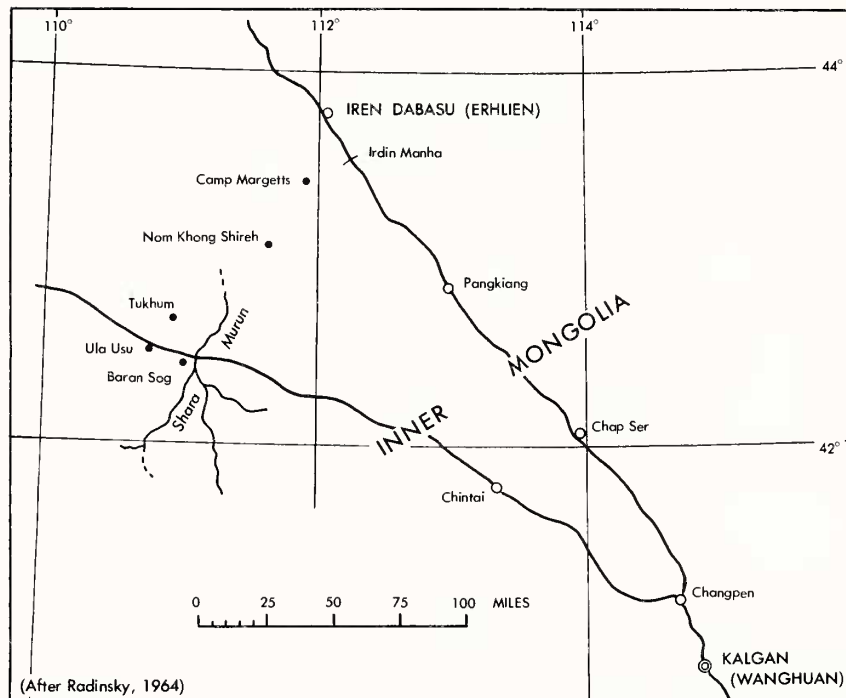


Fig. 7.—Map of a portion of Inner Mongolia, showing Eocene and Oligocene collecting localities of the Central Asiatic Expedition of the American Museum of Natural History.

Lophialetes expeditus Matthew and Granger, 1925⁽¹⁴⁷⁾⁽¹²⁶⁾

?Breviodon minutus (Matthew and Granger, 1925)⁽¹⁴⁷⁾⁽¹²⁶⁾⁽¹⁵⁸⁾

Teleolophus sp. nov. [*“Teleolophus primarius”*]⁽¹⁴⁷⁾ [*“T. rectis”*]⁽¹⁴⁷⁾

Microtitan sp. nov. [*“?Microtitan elongatus”*]⁽¹⁴⁷⁾

Microtitan sp.⁽¹⁴⁷⁾

Desmatotitan sp.⁽¹⁴⁷⁾

Forstercooperia sp. nov. [*“?Forstercooperia grandis”*]⁽¹⁴⁷⁾

Forstercooperia sp. nov. [*“?Forstercooperia elongata”*]⁽¹⁴⁷⁾

Urtinotherium sp. nov. [*“?Urtinotherium minor”*]⁽¹⁴⁷⁾

3. Irдин Manha Formation (Early Late Eocene)

3A. Irдин Manha Area

Granger, W., and C. P. Berkey, 1922⁽⁶²⁾

Berkey, C. P., and F. K. Morris, 1927⁽⁴⁾

Radinsky, L. B., 1964⁽¹⁵⁷⁾

Chow Min-chen and A. K. Rozhdstvensky, 1960⁽⁵⁵⁾

Qi Tao, 1979⁽¹⁴⁷⁾

a. Location: 20 miles south-southeast of Iren Dabasu (Iren-hot).

Coordinates: around 43°30'N; 112°15'E

1922: “23 miles south of Iren Dabasu.”

1923: “Telegraph line camp.”

1979: Su-ji-deng-en-ji Mesa

b. Stratigraphic Sequence: Grey sand-clays, sands and gravels (30 ft).

c. The list of the mammalian fauna:

Irдин Manha Formation (Early Late Eocene)

Order Rodentia Bowdich, 1821

Family Paramyidae Miller and Gidley, 1918

paramyid spp.⁽¹⁰⁶⁾⁽⁶⁸⁾

Order Creodonta Cope, 1875

Family Oxyaenidae Cope, 1877

Sarkastodon mongoliensis Granger, 1938⁽⁸¹⁾

Family Hyaenodontidae Leidy, 1869

Paracynohyaenodon morrissi Matthew and Granger, 1924⁽¹¹⁹⁾

Propterodon irдинensis Matthew and Granger, 1925⁽¹²⁵⁾

Order Carnivora Bowdich, 1821

Family Miacidae Cope, 1880

Miacis invictus Matthew and Granger, 1925⁽¹²⁵⁾

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

Hapalodectes servus Matthew and Granger, 1925⁽¹²⁵⁾⁽¹⁶⁸⁾

Andrewsarchus mongoliensis Osborn, 1924⁽¹³⁶⁾⁽¹⁶⁸⁾

mesonychid gen. indet.⁽¹⁶⁸⁾

Pachyaena sp. (very large form)⁽¹⁶⁸⁾

Mesonyx sp.⁽¹⁶⁸⁾

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Eudinoceras mongoliensis Osborn, 1924⁽¹³⁵⁾

Order Perissodactyla Owen, 1848

Family Brontotheriidae Marsh, 1873

Metatelmatherium parvum Granger and Gregory, 1943⁽⁸⁷⁾*Protitan grangeri* (Osborn, 1925)⁽¹³⁸⁾⁽⁸⁷⁾*Protitan robustus* Granger and Gregory, 1943⁽⁸⁷⁾*Protitan obliquidens* Granger and Gregory, 1943⁽⁸⁷⁾*Microtitan mongoliensis* (Osborn, 1925)⁽¹³³⁾⁽⁸⁷⁾*Gnathotitan berkeyi* (Osborn, 1925)⁽¹³⁸⁾⁽⁸⁷⁾

Family Lophialetidae Radinsky, 1965

Lophialetes expeditus Matthew and Granger, 1925⁽¹²⁶⁾⁽¹⁵⁸⁾*?Lophialetes* sp.⁽¹⁵⁸⁾*Breviodon? minutus* (Matthew and Granger, 1925)⁽¹²⁶⁾⁽¹⁵⁸⁾*?Rhodopagus pygmaeus* Radinsky, 1965⁽¹⁵⁸⁾*Simplaletes sujiensis* Qi, 1980⁽¹⁴⁹⁾

Family Deperetellidae Radinsky, 1965

Teleolophus medius Matthew and Granger, 1925⁽¹²⁶⁾⁽¹⁵⁸⁾

Family Helaletidae Osborn, 1892

Helabetes mongoliensis (Osborn, 1923)⁽¹³³⁾⁽¹⁵⁸⁾

Family Hyracodontidae Cope, 1879

Triplopus? proficiens (Matthew and Granger, 1925)⁽¹²⁶⁾⁽¹⁵⁹⁾

Family Rhinocerotidae Owen, 1845

Forstercooperia totidentata (Wood, 1938)⁽²⁰⁵⁾⁽¹⁵⁹⁾

Order Artiodactyla Owen, 1848

Family Choeropotamidae Owen, 1845

Gobiohyus orientalis Matthew and Granger, 1925⁽¹²⁵⁾*Gobiohyus pressidens* Matthew and Granger, 1925⁽¹²⁵⁾*Gobiohyus robustus* Matthew and Granger, 1925⁽¹²⁵⁾

Family Entelodontidae Lydekker, 1883

achaenodont indet.⁽¹²⁵⁾

Mammalia, Order indet.

Family Didymoconidae Kretzoi, 1943

Mongoloryctes auctus (Matthew and Granger, 1925)^{(125)(192a)}

Addition to the list above:

Insectivora

?Pantolestes sp.⁽⁴⁾

Artiodactyla

cf. *Archaeomeryx* indet.⁽⁴⁾

(From Geology of Mongolia, by C. P. Berkey and

F. K. Morris, 1927. Amer. Mus. Nat. Hist., p. 360–361.)

3B. Camp Margetts Area (Huhebolhe Cliff)⁵Radinsky, L. B., 1964⁽¹⁵⁷⁾Qi Tao, 1979⁽¹⁴⁷⁾Qi Tao, 1980⁽¹⁴⁸⁾

a. Location: 25 miles south-southwest of Iren Dabasu; 18 miles west-southwest of Irдин Manha type locality.

Coordinates: around 43°25'N; 111°50'E

1923: AMNH field locality no. 147; a few miles north of Camp Margetts, 1930.

1930: Six principal localities of AMNH around Camp Margetts.

1980: IVPP field no. 77037.

b. Stratigraphic Sequence:

Section of 1923 (AMNH loc. 147):

“Houldjin Gravels” beds—(“Early Oligocene”)

Yellow sands and gravels (10 ft).

“Irдин Manha” beds

White to grey arkosic concretionary sandstone and conglomerates, a thin local grey clay (Main fossil layer) (30 ft).

Grey clayey sandstone, with some pink layers (35 ft).

Barren red sandy clays (40 ft).

Grey clay (at base).

c. The list of the mammalian fauna:

Irдин Manha Formation (Early Late Eocene)

Order Rodentia Bowdich, 1821

Family Paramyidae Miller and Gidley, 1918

paramyid spp.⁽¹⁴⁷⁾⁽⁶⁸⁾

Family Cocomyidae Dawson, Li, and Qi, in press

Advenimus burkei Dawson, 1964⁽⁶⁸⁾

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

Mongolonyx dolichognathus Szalay and Gould, 1966⁽¹⁶⁸⁾

Family Arctocyonidae Murray, 1886

Paratriisodon gigas Chow, Li, and Chang, 1973⁽¹⁴⁸⁾⁽⁵²⁾

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

Gobiotherium mirificum Osborn and Granger, 1932⁽¹⁴²⁾

Order Perissodactyla Owen, 1848

Family Brontotheriidae Marsh, 1873

Metatelmatherium cristatum Granger and Gregory, 1943⁽⁸⁷⁾*Protitan minor* Granger and Gregory, 1943⁽⁸⁷⁾*?Protitan cingulatus* Granger and Gregory, 1943⁽⁸⁷⁾

Upper (Late Eocene), Irдин Manha [77037]; only five meters in thickness; Middle (Middle Eocene), Arshanto, with 35 mammalian species (see Section 2-2), including 22 new ones field nos. [77027, 77034, 77036, 77039]; about 30 m; Lower (Early Eocene), Bayan Ulan, with *Mongolotherium* sp. (see 2-1); about 36 m.

Qi mentioned that only six species were collected from the Irдин Manha Formation and the others may be from the Middle zone. Until the study of the new collection has been completed, it is very difficult to give accurate stratigraphic data for the fossils listed here. Following the American authors, we tentatively refer all the specimens collected from this area to the same horizon, the Irдин Manha Formation.

⁵ “The available evidence thus suggests that the relationship between the beds called “Irдин Manha” in the Camp Margetts area and the type Irдин Manha beds is complex and not yet fully understood . . .” (Radinsky, 1964:5).

According to Qi (1980:28, 31)⁽¹⁴⁸⁾ the fossil mammals described from Camp Margetts area (Huhebolhe Cliff) may represent different horizons. Qi divided the Early Tertiary strata of this area into three zones:

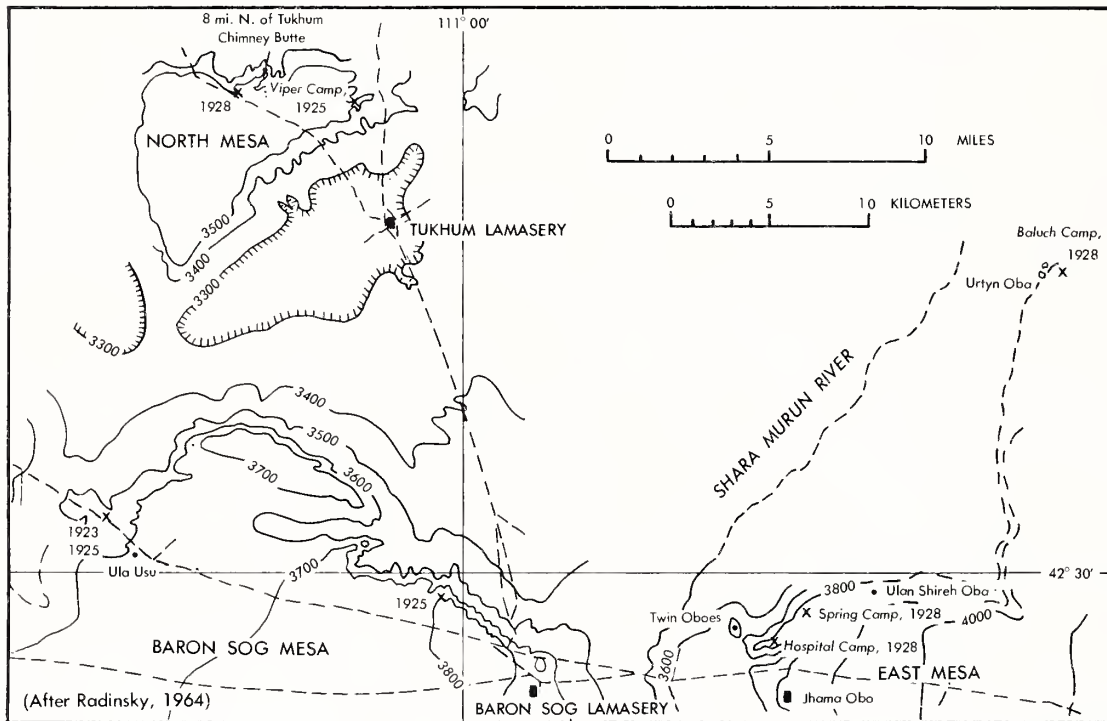


Fig. 8.—Topographic map of the Shara Murun region of Inner Mongolia, showing camp sites (marked by an X) and collecting localities of the Central Asiatic Expedition of the American Museum of Natural History. Contour interval is 100 feet.

Family Lophialetidae Radinsky, 1965

Breviodon sp.⁽¹⁵⁸⁾

Lophialetes expeditus Matthew and Granger, 1925⁽¹²⁶⁾⁽¹⁵⁸⁾

cf. *Schlosseria magister* Matthew and Granger, 1926⁽¹²⁷⁾⁽¹⁵⁸⁾

Family Deperetellidae Radinsky, 1965

cf. *Teleolophus medius* Matthew and Granger, 1925⁽¹²⁶⁾⁽¹⁵⁸⁾

Family Helaletidae Osborn, 1892

Helaletes fissus (Matthew and Granger, 1925)⁽¹²⁶⁾⁽¹⁵⁸⁾

?*Helaletes fissus* (Matthew and Granger, 1925)⁽¹²⁶⁾⁽¹⁵⁸⁾

Helaletes sp.⁽¹⁵⁸⁾

cf. *Hyrachyus* sp.⁽¹⁵⁸⁾

Family Rhinocerotidae Owen, 1845

Forstercooperia confluens (Wood, 1963)⁽¹⁵⁹⁾⁽²⁰⁶⁾

Family Chalicotheriidae Gill, 1872

Litolophus gobiensis (Colbert, 1934)⁽¹⁶⁵⁾⁽¹⁵⁶⁾

3C. Shara Murun Area⁶

⁶ As to the East Mesa of Shara Murun Region, the typical section at Urtyn Obo was published by Osborn (1929:5) (Fig. 9).

The fossil mammals of the Early Late Eocene described from East Mesa were few and most forms were shared with North Mesa and Baron Sog Mesa.

Dr. Radinsky's opinion is that:

"The main difficulty in correlating the strata exposed at East Mesa, Urtyn Obo,

(1) North Mesa: including Buckshot's quarry, Chimney Butte—the Ulan Shireh beds.

(2) Baron Sog Mesa—"the lower red beds or Tukhum beds."

Berkey, C. P., and F. K. Morris, 1927⁽⁴⁾

Berkey, C. P., W. Granger, and F. K. Morris, 1929⁽³⁾

Radinsky, L. B., 1964⁽¹⁵⁷⁾

Chow Min-chen and A. K. Rozhdestvensky, 1960⁽⁵⁵⁾

Qi Tao, 1974⁽¹⁴⁷⁾

a. Location: West of Shara Murun River, Inner Mongolia.

Coordinates: around 42°30'N; 111°00'E (Fig. 8)

b. Stratigraphic Sequence (after Radinsky, 1964, p. 7-8):

and Nom Khong Shireh with the type Shara Murun and Ulan Gochu beds at Baron Sog Mesa is that the lithology of these beds is too variable to allow correlation on the basis of lithology alone.

"The main problem in working out the stratigraphic sequence east of the Shara Murun River is the delimiting of the boundaries between the Ulan Shireh, Shara Murun and Ulan Gochu beds. These apparently must be determined largely on paleontology evidence, but the relevant collections have not yet been completely studied, and the faunal successions are not well enough known to provide the necessary information.

"It would thus appear that the stratigraphic information for specimens collected at East Mesa, Urtyn Obo and Nom Khong Shireh cannot be completely trusted. Specimens from beds called 'Shara Murun' or 'Ulan Gochu' at those localities are not necessarily the same age as the respective type fauna." (Radinsky, 1965:9-10).

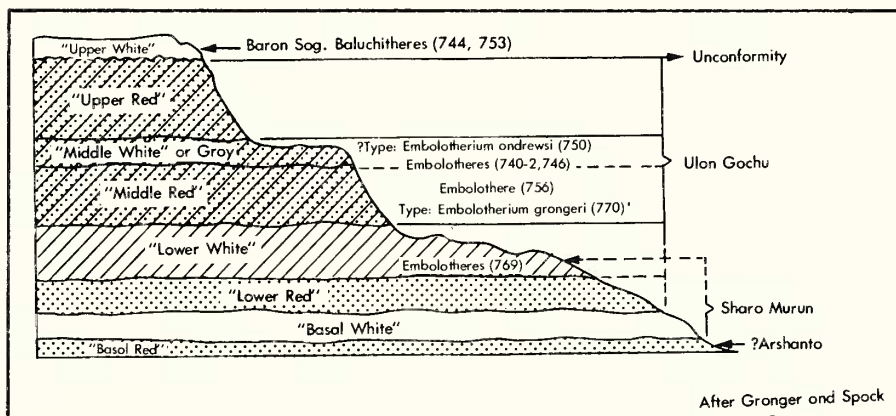


Fig. 9.—Section of Urtyn Obo, Baluchitheres Camp. (Published in Osborn 1929:5, fig. 2, section 2; the explanation of the section following Radinsky, 1964:9.)

1. Baron Sog Mesa:
 - Baron Sog beds: white clays and sands (15–20 ft).
 - Ulan Gochu beds: red clay (50 ft).
 - Shara Murun beds: light varicolored clays, predominantly grey toward the top (over 200 ft).
 - Tukhum beds: red beds.
2. North Mesa:
 - Ulan Shireh beds: richly fossiliferous, multi-colored, predominantly red clays (over 150 ft).
- c. The list of the mammalian fauna:
 - Irdin Manha Formation (Early Late Eocene)
 - Order Lagomorpha Brandt, 1855
 - Family Leporidae Gray, 1821
 - Shamolagus grangeri* Burke, 1941⁽¹⁰⁾
 - Order Rodentia Bowdich, 1821
 - Family Cocomyidae Dawson, Li, and Qi, in press⁽⁷⁰⁾
 - Advenimus bohlini* Dawson, 1964⁽⁶⁸⁾
 - cf. *Advenimus* sp.⁽⁶⁸⁾
 - Order Condylarthra Cope, 1881
 - Family Mesonychidae Cope, 1875
 - ?*Harpagolestes orientalis* Szalay and Gould, 1966⁽¹⁶⁸⁾
 - mesonychid gen. indet. (very large form)⁽¹⁶⁸⁾
 - cf. *Mesonyx* sp.⁽¹⁶⁸⁾
 - Order Pantodonta Cope, 1873
 - Family Coryphodontidae Marsh, 1876
 - Eudinoceras kholobolchiensis* Osborn and Granger, 1931⁽¹⁴¹⁾
 - Family Pantolambodontidae Granger and Gregory, 1934
 - Pantolambodon inermis* Granger and Gregory, 1934⁽⁸³⁾
 - Pantolambodon fortis* Granger and Gregory, 1934⁽⁸³⁾
 - Order Perissodactyla Owen, 1848
 - Family Brontotheriidae Marsh, 1873
 - Desmatotitan tukhumensis* Granger and Gregory, 1943⁽⁸⁷⁾
 - Epimanteoceras formosus* Granger and Gregory, 1943⁽⁸⁷⁾
 - Protitan bellus* Granger and Gregory, 1943⁽⁸⁷⁾
 - Microtitan mongoliensis* (Osborn, 1925)⁽¹³⁸⁾⁽⁸⁷⁾
 - Dolichorhinoides angustidens* Granger and Gregory, 1943⁽⁸⁷⁾
 - Family Lophialetidae Radinsky, 1965
 - Breviodon acares* Radinsky, 1965⁽¹⁵⁸⁾
 - cf. *Breviodon acares* Radinsky, 1965⁽¹⁵⁸⁾
 - ?*Breviodon* sp.⁽¹⁵⁸⁾
 - Lophialetes expeditus* Matthew and Granger, 1925⁽¹²⁶⁾⁽¹⁵⁸⁾
 - Lophialetes* sp.⁽¹⁵⁸⁾
 - Rhodopagus pygmaeus* Radinsky, 1965⁽¹⁵⁸⁾
 - Simplaites ulanshierhensis* Qi, 1980⁽¹⁴⁹⁾
 - Family Deperetellidae Radinsky, 1965
 - ?*Teleolophus medius* Matthew and Granger, 1925⁽¹²⁶⁾⁽¹⁵⁸⁾
 - Family Hyracodontidae Cope, 1879
 - ?*Triplopus proficiens* (Matthew and Granger, 1925)⁽¹²⁶⁾⁽¹⁵⁹⁾
 - Teilhardia pretiosa* Matthew and Granger, 1926⁽¹²⁷⁾⁽¹⁵⁹⁾
 - Family Arynodontidae Scott and Osborn, 1883
 - ?*Lushiamynodon sharamurenensis* Xu, 1966⁽²¹⁵⁾
 - Family Rhinocerotidae Owen, 1845
 - Forstercooperia* sp.⁽¹⁵⁹⁾
 - 4. Shara Murun Formation (Late Late Eocene)
 - Shara Murun Area-Ula Usu
 - Berkey, C. P., and W. Granger, 1923⁽²⁾
 - Berkey, C. P., and F. K. Morris, 1927⁽⁴⁾
 - Chow Min-chen and A. K. Rozhdestvensky, 1960⁽⁵⁵⁾

- Radinsky, L. B., 1964⁽¹⁵⁷⁾
 Qi Tao, 1979⁽¹⁴⁷⁾
- a. Location: Ula Usu, Baron Sog Mesa, west of the Shara Murun River, Inner Mongolia.
 Coordinates: around 42°30'N; 110°45'E
- b. Stratigraphic Sequence (Baron Sog Mesa):
 Baron Sog beds: light grey clays and sands (upper white stratum) (15 ft).
 Ulan Gochu beds: red clay (upper red beds) (50 ft).
 Shara Murun beds: soft grey clay, with brown, red, purple layers in the bottom part, main fossil layer (over 200 ft).
 Turkhun beds: hard red clay (*Teilhardia pretiosa* beds).
- c. The list of the mammalian fauna:
 Shara Murun Formation (Late Late Eocene)
 Order Lagomorpha Brandt, 1855
 Family Leporidae Gray, 1821
Shamolagus medius Burke, 1941⁽¹⁰⁾⁽¹⁰⁷⁾
Gobiolagus tolmachovi Burke, 1941⁽¹⁰⁾
 Order Rodentia Bowdich, 1821
 Family Yuomyidae Dawson, Li, and Qi, in press
Yuomys cavioides Li, 1975⁽¹⁰⁸⁾
 Family indet. (Matthew and Granger, 1925: 4; not seen)⁽¹²⁴⁾
 Order Creodonta Cope, 1875
 Family Hyaeodontidae Leidy, 1869
Pterodon hyaenoides Matthew and Granger, 1925⁽¹²⁴⁾
 Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
Rhinotitan kaiseni (Osborn, 1925)⁽¹³⁸⁾⁽⁸⁷⁾
Rhinotitan mongoliensis (Osborn, 1925)⁽¹³⁸⁾⁽⁸⁷⁾
Rhinotitan andrewsi (Osborn, 1925)⁽¹³⁸⁾⁽⁸⁷⁾
Pachytitan ajax Granger and Gregory, 1943⁽⁸⁷⁾
Titanodectes minor Granger and Gregory, 1943⁽⁸⁷⁾
 Family Lophialetidae Radinsky, 1965
Rhodopagus? minimus (Matthew and Granger, 1926)⁽¹²⁴⁾⁽¹⁵⁸⁾
 Family Deperetellidae Radinsky, 1965
Deperetella cristata Matthew and Granger, 1925⁽¹²⁴⁾⁽¹⁵⁸⁾
 Family Hyracodontidae Cope, 1879
Triplopus? progressus (Matthew and Granger, 1925)⁽¹²⁴⁾⁽¹⁵⁹⁾
 Family Amynodontidae Scott and Osborn, 1883
Amynodon mongoliensis Osborn, 1936⁽¹⁴⁰⁾⁽²¹⁵⁾
Sianodon ulausuensis Xu, 1966⁽²¹⁵⁾
Lushiamynodon sharamurenensis Xu, 1966⁽²¹⁵⁾
Gigantamynodon promissus Xu, 1966⁽²¹⁵⁾
Sianodon spp.⁽²¹⁵⁾
 Amynodontidae indet.⁽²¹⁵⁾
- Caenolophus promissus* Matthew and Granger, 1925⁽¹²⁴⁾⁽¹⁵⁸⁾
Caenolophus obliquus Matthew and Granger, 1925⁽¹²⁴⁾⁽¹⁵⁸⁾
 Family Rhinocerotidae Owen, 1845
Juxia sharamurenense Chow and Chiu, 1964⁽⁴⁷⁾⁽¹⁵⁹⁾
 Family Chalicotheriidae Gill, 1872
Olsenia mira Matthew and Granger, 1925⁽¹²⁴⁾⁽⁶⁵⁾⁽¹⁸⁰⁾⁽¹⁶⁸⁾
 Order Artiodactyla Owen, 1848
 Family Anthracotheriidae Gill, 1872
Ulausuodon parvus Hu, 1963⁽⁹³⁾
 Family Hypertragulidae Cope, 1879
Archaeomeryx optatus Matthew and Granger, 1925⁽¹²⁴⁾
- II. Xin-jiang (Sinkiang) Region
 5. Turpan (Turfan) Basin
 Zhai Ren-jie, Zheng Jia-jian, and Tong Yong-sheng, 1978⁽²⁴¹⁾
 Zhai Ren-jie, 1978⁽²³⁷⁾⁽²³⁸⁾
 Zheng Jia-jian, 1978⁽²⁵⁰⁾
- a. Location: Turpan and Shan-shan counties, Xin-jiang Region.
 Coordinates: 42°45'–43°12'N; 89°05'–91°36'E; 43°12'N; 91°36'E (Shi-san-jian-fang railway station)
- b. Stratigraphic Sequence:
 Lian-kan Formation (Late Late Eocene)
 Grey-red muddy sandstones, greyish-yellow, white and red sandstones, orange-red sandstones and blue conglomerates [66014, 66020] (80 m).
 Shi-san-jian-fang Formation (? Late Early Eocene or Early Middle Eocene)
 Yellow fresh limestones, greyish yellow coarse sandstones, red muddy sandstones, light red sandstones, and greyish red, white conglomerates [66019] (300 m).
 Da-bu Formation (Early Eocene)
 Purple-red mudstones with white calcareous concretionary layers, grey-white mudstones, sandstones and conglomerates [66015] (22 m).
- c. The list of the mammalian fauna:
 Lian-kan Formation (Late Late Eocene)
 Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
?Rhinotitan sp.⁽²⁵⁰⁾
 Family Lophialetidae Radinsky, 1965
Lophialetes expeditus Matthew and Granger, 1925⁽²⁵⁰⁾⁽¹²⁶⁾
 gen. et sp. indet. 1. 2. 3.⁽²⁵⁰⁾
 Family Deperetellidae Radinsky, 1965
Teleolophus liankanensis Zheng, 1978⁽²⁵⁰⁾
 Family Amynodontidae Scott and Osborn, 1883
Amynodon mongoliensis Osborn, 1936⁽²⁵⁰⁾⁽¹⁴⁰⁾
Amynodon sp.⁽²⁵⁰⁾
 Order Artiodactyla Owen, 1848

Table 3.—A comparison of the fossils from the Irdin Manha Formation and Shara Murun Formation.

Irdin Manha Fauna (Early Late Eocene or Late Middle Eocene)	Shara Murun Fauna (Late Late Eocene)
<i>Shamolagus grangeri</i>	<i>Shamolagus medius</i>
paramyid spp.	Rodentia indet.
<i>Advenimus burkei</i>	<i>Yuomys cavioides</i>
<i>Advenimus bohlini</i>	
cf. <i>Advenimus</i> sp.	
<i>Paracynohyaenodon morrisi</i>	<i>Pterodon hyaenoides</i>
<i>Propterodon iridinensis</i>	
<i>Sarkastodon mongoliensis</i>	
<i>Miacis invictus</i>	
<i>Paratriisodon gigas</i>	
<i>Hapalodectes serus</i>	
<i>Andrewsarchus mongoliensis</i>	
<i>Mongolonyx dolichognathus</i>	
<i>Harpagolestes orientalis</i>	
cf. <i>Mesonyx</i> sp.	
<i>Pachyaena</i> sp.	
Mesonychidae indet.	
<i>Eudinoceras mongoliensis</i>	
<i>Eudinoceras kholobolchiensis</i>	
<i>Pantolambdodon inermis</i>	
<i>Pantolambdodon fortis</i>	
<i>Gobiatherium mirificum</i>	
<i>Metatelmatherium cristatum</i>	<i>Rhinotitan kaiseni</i>
<i>Metatelmatherium parvum</i>	<i>Rhinotitan mongoliensis</i>
<i>Protitan grangeri</i>	<i>Rhinotitan andrewsi</i>
<i>Protitan robustus</i>	<i>Pachytitan ajax</i>
<i>Protitan obliquidens</i>	<i>Titanodectes minor</i>
<i>Protitan minor</i>	
? <i>Protitan cingulatus</i>	
<i>Protitan bellus</i>	
<i>Microtitan mongoliensis</i>	
<i>Gnathotitan berkeyi</i>	
<i>Desmatotitan tukhumensis</i>	
<i>Epimanteoceras formosus</i>	
<i>Dolichorhinoides angustidens</i>	
<i>Litolophus gobiensis</i>	<i>Olsenia mira</i>
<i>Lophialetes expeditus</i>	
<i>Lophialetes</i> sp.	
<i>Breviodon ? minutus</i>	
<i>Breviodon acares</i>	
cf. <i>Breviodon acares</i>	
? <i>Breviodon</i> sp.	
? <i>Rhodopagus pygmaeus</i>	<i>Rhodopagus ? minimus</i>
<i>Simplaletes sujiansis</i>	
<i>Simplaletes ulanshierhensis</i>	
cf. <i>Schlosseria magister</i>	
<i>Teleolophus medius</i>	
? <i>Teleolophus medius</i>	<i>Deperetella cristata</i>
<i>Helaletes mongoliensis</i>	
<i>Helaletes fissus</i>	
? <i>Helaletes fissus</i>	

Table 3.—Continued.

Irdin Manha Fauna (Early Late Eocene or Late Middle Eocene)	Shara Murun Fauna (Late Late Eocene)
<i>Helaletes</i> sp.	
cf. <i>Hyrachyus</i> sp.	
<i>Triplopus ? proficiens</i>	<i>Triplopus ? progressus</i>
<i>Forstercooperia totadentata</i>	
<i>Forstercooperia confluens</i>	<i>Juxia sharamurunense</i>
<i>Teilhardia pretiosa</i>	
	<i>Amynodon mongoliensis</i>
	<i>Sianodon ulausensis</i>
	<i>Sianodon</i> spp.
? <i>Lushiamynodon sharamure-</i> <i>nensis</i>	<i>Lushiamynodon sharamure-</i> <i>nensis</i>
	<i>Gigantamynodon promissus</i>
	Amynodontidae indet.
	<i>Caenolophus promissus</i>
	<i>Caenolophus obliquus</i>
<i>Gobiohyus orientalis</i>	
<i>Gobiohyus pressidens</i>	
<i>Gobiohyus robustus</i>	
archaenodont indet.	
	<i>Ulausuodon parvus</i>
	<i>Archaeomeryx optatus</i>
<i>Mongoloryctes auctus</i>	
63 forms	24 forms

Family Anthracotheriidae Gill, 1872

Bothriodon sp.⁽²⁵⁰⁾

Family Hypertragulidae Cope, 1879

Xinjiangmeryx parvus Zheng, 1978⁽²⁵⁰⁾

Shi-san-jian-fang Formation (? Late Early Eocene or Early Middle Eocene) [66019]

Order Anagalida Szalay and McKenna, 1971

Family Eurymylidae Matthew, Granger, and Simpson, 1929

Rhombomylus turpanensis Zhai, 1978⁽²³⁸⁾

Order Notoungulata Roth, 1903

Family Arctostylopidae Schlosser, 1923

Anatolostylops dubius Zhai, 1978⁽²³⁸⁾

Order Condylarthra Cope, 1881

Family Hyopsodontidae Lydekker, 1889

Hyopsodus sp.⁽²³⁸⁾

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Coryphodon sp.⁽²³⁸⁾

Order Perissodactyla Owen, 1848

Family Helaletidae Osborn, 1872

Heptodon tianshanensis Zhai, 1978⁽²³⁸⁾

Da-bu Formation (Early Eocene)

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Coryphodon dabuensis Zhai, 1978⁽²³⁷⁾

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

Pyrodon xinjiangensis Zhai, 1978⁽²³⁷⁾

6. Jung-gur (Dzungar) Basin

Only four forms of Eocene mammals were discovered in the Jung-gur Basin.

The stratigraphic and geographic distributions of these fossils may be tentatively given as following^(22, 28, 48, 144):

Fossil	Locality	Horizon
<i>Lophialetes cf. expeditus</i>	North area of the Basin (around 46°N; 88°E)	U-lun-gu Formation (Late Eocene)
Felidae	North of the Manas Lake (around 46°N; 87°E)	U-lun-gu Formation (Late Eocene)
<i>Eudinoceros sp.</i> ⁽⁴⁸⁾	North area of the Basin (Yi-xi-bu-la-ke, south part of Ulungur depression, around 46°N; 88°E)	Hong-li-shan Formation (Late Eocene or earlier)
<i>Bothriodon sp.</i>	South area of the Basin (Manas River area, around 44°N; 86°E)	Lu-se (Green) Formation (Late Eocene)

III. Shaan-xi (Shensi) Province

7. Lan-tian District

Chia Lan-po, Chang Yu-ping, Huang Wan-po, Tang Ying-jun, Chi Hung-xiang, Yu Yü-zhu, Ting Su-yin, and Huang Xue-shi, 1966⁽¹⁵⁾
Wang Ban-yue, 1978⁽¹⁹⁶⁾

- Location: Lin-tong County, Shaan-xi Province. Coordinates: 34°24'N; 109°13'E (Lin-tong city)
- Stratigraphic Sequence: Hong-he Formation (Late Eocene)
Purplish red mudstone and sandy mudstone interbedding with fine sandstone [65009, 65013] (200 m).
- The list of the mammalian fauna:
Hong-he Formation (Late Eocene)
Order Perissodactyla Owen, 1848
Family Brontotheriidae Marsh, 1873
Arctotitan honghoensis Wang, 1978⁽¹⁹⁶⁾ [65009]
Family Lophialetidae Radinsky, 1965
Breviodon sp.⁽¹⁹⁶⁾ [65013]
Family Deperetellidae Radinsky, 1965
cf. *Deperetella sp.*⁽¹⁹⁶⁾

IV. Bei-jing (Peking) and He-bei (Hopei) Province

8. Chang-xin-dian (Changshintien) Locality

Young Chung-chien, 1934⁽²²⁶⁾
Chow Min-chen, 1953⁽¹⁹⁾
Zhai Ren-jie, 1977⁽²³⁶⁾

- Location: About 20 km southwest of the Bei-jing (Peking) City.

Coordinates: 39°49'N; 116°14'E (Chang-xin-dian town)

- Stratigraphic Sequence: A thick series of conglomerates and red clays.

- The list of the mammalian fauna:

Order Insectivora Bowdich, 1821

Family Erinaceidae Bonaparte, 1838

?*Tupaiaodon sp.*⁽¹⁹⁾⁽¹²⁰⁾

Order Anagalida Szalay and McKenna, 1971

Family Eurymylidae Matthew, Granger, and Simpson, 1929

Hypsomylylus beijingensis Zhai, 1977⁽²³⁶⁾

Order Carnivora Bowdich, 1821

Family Miacidae Cope, 1880

Miacis sp.⁽²³⁶⁾

Family Canidae Gray, 1821

gen. et sp. indet.⁽²³⁶⁾

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

?*Eudinoceras sp.*⁽²²⁶⁾

Order Perissodactyla Owen, 1848

Family Hyracodontiade Cope, 1879

Imequincisorina sp.⁽²³⁶⁾⁽¹⁹⁹⁾

9. Ling-shan Locality

In 1961 a few fragmentary mammalian teeth were found in the Ling-shan area (38°47'N; 114°38'E). Judging from a molar of an amynodontid⁽³⁵⁾⁽²¹⁵⁾, the deposits yielding the fossils may be correlated with the Yuan-chu Formation as Late Eocene in age.

V. Shan-dong (Shantung) Province

10. Wu-tu Basin

Li Chuan-kuei, 1962⁽¹⁰⁵⁾

Chow Min-chen and Li Chuan-kuei, 1965⁽⁵¹⁾

- Location: Wu-tu coal mine, 10 km southeast of Chang-le County, Shan-dong Province.

Coordinates: 36°42'N; 118°49'E (Chang-le city)

- Stratigraphic Sequence:

Wu-tu Formation (Early Eocene)

Dark colored oil-shales, coals, and purple-red, green mudstones and conglomerates [62058].

- The list of the mammalian fossils:

Wu-tu Formation (Early Eocene)

Order Perissodactyla Owen, 1848

Family Isectolophidae Peterson, 1919

Homogalax wutuensis Chow and Li, 1965⁽⁵¹⁾⁽¹⁵⁸⁾

11. Niu-shan Basin

Li Chuan-kuei, 1962⁽¹⁰⁵⁾

Chow Min-chen and Li Chuan-kuei, 1965⁽⁵¹⁾

- Location: 8 km south of Lin-qu (Lin-chu) city.

Coordinates: 36°30'N; 118°32'E (Lin-qu city).

- Stratigraphic Sequence:

Niu-shan Member of Wu-tu Formation (Early Eocene)

Black oil shales, greyish green and brownish red clay, mudstone and sandstone [62057].

- The list of the mammalian fossils:

Niu-shan Member of Wu-tu Formation (Early Eocene)

Order Perissodactyla Owen, 1848
 Family Helaletidae Osborn, 1892
Heptodon niushanensis Chow and Li,
 1965⁽⁵¹⁾⁽¹⁵⁸⁾

12. Xin-tai (Sintai) Basin

Tan, H. C., 1923⁽¹⁷⁰⁾
 Zdansky, O., 1930⁽²³⁵⁾
 Young Chung-chien and Bien Mei-nan, 1935⁽²²⁹⁾
 Li Chuan-kuei, 1962⁽¹⁰⁵⁾

a. Location: From north of the Men-yin city to the north of Xin-tai city, extending NW–SE about 20 km, Shan-dong Province.

Coordinates: 35°54'N; 117°44'E (Xin-tai city).

b. Stratigraphic Sequence:

Guan-zhuang Formation (Middle Eocene)
 (> 1,500 m)

Upper: dark brown conglomerates and breccia.
 Middle: greyish green mudstones and grey red sandstone. Most fossils were collected from this horizon.⁷

Lower: conglomerate sandstone intercalated with marls.

— Unconformity —

Late Jurassic or Early Cretaceous Men-yin Series
 yielding *Euhelopus zdanskyi*

c. The list of the mammalian fauna:

Guan-zhuang Formation (Middle Eocene)

Order Rodentia Bowdich, 1821

gen. et sp. indet.⁽²³⁵⁾

Order Creodonta Cope, 1875

Family Hyaenodontidae Leidy, 1869

?*Thinocyon sichowensis* Chow, 1975⁽⁴¹⁾

Order Condylarthra Cope, 1881

Family ?Hyopsodontidae Lydekker, 1889

?*Haplomylus* sp.⁽²³⁵⁾

Order Tillodontia Marsh, 1875

?Family Tillodontidae Marsh, 1875

Kuanchuanius shantunensis Chow,
 1963⁽³⁷⁾

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Coryphodon flerowi Chow, 1957⁽²⁴⁾⁽²¹⁶⁾

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

?cf. *Uintatherium* sp.⁽⁵⁶⁾

Order Perissodactyla Owen, 1848

Family Palaeotheriidae Gill, 1872

Propalaeotherium sinensis Zdansky,
 1930⁽²³⁵⁾

Family Equidae Gray, 1821

Hyracotheriinae, gen. et sp. indet. 1. 2.⁽²³⁵⁾

Heptaconodon dubium Zdansky, 1930⁽²³⁵⁾

Family ?Lophialetidae Radinsky, 1965

?*Rhodopagus* sp.⁽²³⁵⁾⁽¹⁵⁸⁾

Family Helaletidae Osborn, 1892

Hyrachyus spp.⁽²³⁵⁾

Family Eomoropidae Viret, 1958

Grangeria canina Zdansky, 1930⁽²³⁵⁾⁽¹⁵⁶⁾

VI. Shan-xi (Shansi) Province

13. Yuan-chu Basin

Anderson, J. G., 1923⁽¹⁾

Young Chung-chien, 1937⁽²²⁷⁾

Lee Yuen-yen, 1938⁽¹⁰³⁾

Chow Min-chen, Li Chuan-kuei, and Chang Yu-ping, 1973⁽⁵²⁾

Hartenberger, J.-L., J. Sudre, and M. Vianey-Liaud, 1975⁽⁸⁹⁾

a. Location: More than 20 Late Eocene mammalian localities of Yuan-chu Basin mainly discovered along both banks of the Yellow River from the old city of Yuan-chü, Shan-xi Province, upward to the village of Ren-cun (Jen-tsun), Mian-chi County, He-nan Province.

Coordinates: 35°06'N; 111°53'E (old city of Yuan-chü)

(Fig. 10)

b. Stratigraphic Sequence:

Yuan-chü Series

Bai-shui-cun (Pai-sui-tsun) Formation (Early Oligocene)

Light blue and white mudstones, limestones and lignites (15 m).

He-ti (Ho-ti) Formation (Late Late Eocene) (up to 1,000 m)

Chai-li Member ("River section"):

Greyish white marls, light colored mudstones and sandstones.

— Disconformity —

Ren-cun (Jen-tsun) Member:

Yellow, green, and varied colored clays, shales, and sandstones, with very thick conglomerates in the basal portion.

c. The list of the mammalian fauna:

Bai-shui-cun Formation (Early Oligocene)

Order Artiodactyla Owen, 1848

Family Anthracotheriidae Gill, 1872

Brachyodus hui (Chow, 1958)⁽²⁰⁾⁽²⁷⁾⁽²¹³⁾

He-ti Formation (Late Late Eocene)

Chai-li Member ("River section" and Loc. 1 of

Zdansky, Field no. 5301 of Chow):

Order Insectivora Bowdich, 1821

Family Leptictidae Gill, 1872

Ictopidium lechei Zdansky, 1930⁽²³⁵⁾⁽⁵²⁾

Order Primates Linnaeus, 1758

Family Omomyidae Trouessart, 1879

Hoanghoniush stehlini Zdansky,
 1930⁽²³⁵⁾⁽²⁰²⁾⁽⁶⁷⁾⁽⁵²⁾

Order Rodentia Bowdich, 1821

Family ?Ischyromyidae Alston, 1876

gen. et sp. indet. (or Ctenodactyloidea)⁽⁸⁹⁾

Family Cricetidae Rochebrune, 1883

Cricetodon schaubi Zdansky,
 1930⁽²³⁵⁾⁽⁵²⁾⁽⁸⁹⁾

Family Zapodidae Coues, 1875

?*Plesiosminthus* sp.⁽⁸⁹⁾⁽²³⁵⁾

⁷ The Middle Eocene mammals of Xin-tai Basin were mostly collected by Tan (1922) around a village of Kuan-chuang (perhaps the Chang-lu-kuan-chuang, 10 km SE of Xin-tai city), except a chalicothere, *Grangeria canina*, which may have been discovered from a younger horizon ("Ardyn Obo" or Sannoisian). Unfortunately, we cannot re-examine where Tan's localities were. All the materials collected by Li and his colleagues (1960, 1962) were found in a small quarry, Xi-xi-zhou (Si-si-chou), 5 km WNW of Xin-tai city (probably the same locality of Tan's Hsi-kou).

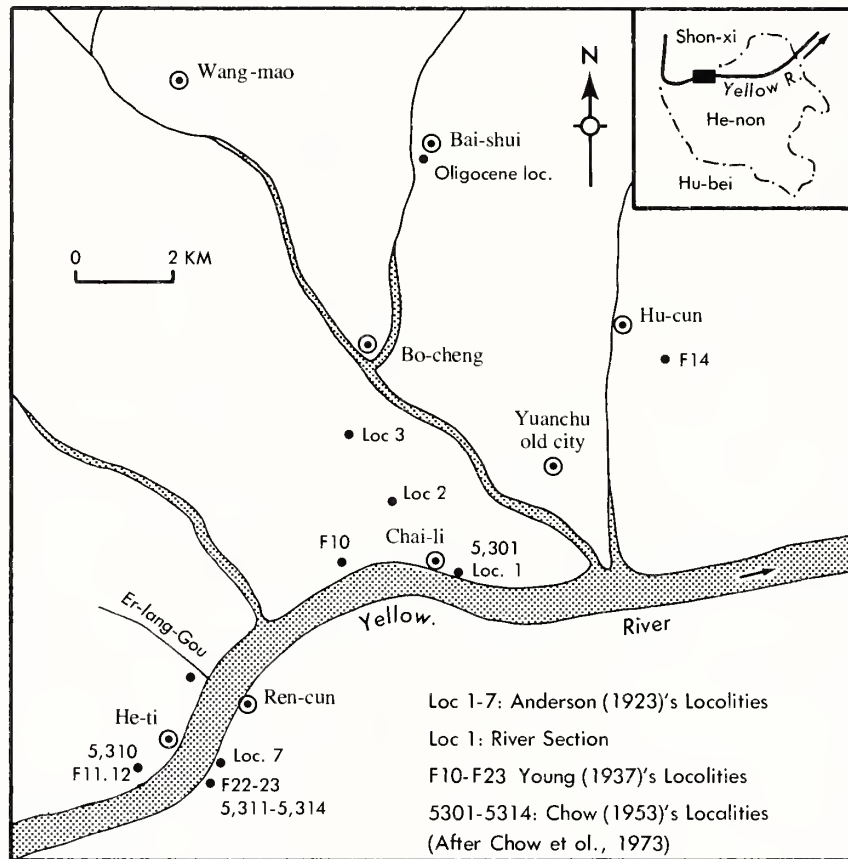


Fig. 10.—Map of the fossil localities of Yuan-chu Basin.

Order Creodonta Cope, 1875
 Family Hyaenodontidae Leidy, 1869
Hyaenodon yuanchuensis Young, 1937
 (Loc. F 10)⁽²²⁷⁾⁽⁵²⁾

Order Carnivora Bowdich, 1821
 Family Canidae Gray, 1821
Chailicyon crassidens Chow, 1975⁽⁴¹⁾

Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
Rhinotitan mongoliensis (Osborn, 1925)⁽²²⁷⁾⁽¹³⁸⁾⁽⁸⁷⁾

Family Amarynodontidae Scott and Osborn, 1883
?Amarynodon mongoliensis Osborn, 1936⁽²²⁷⁾⁽¹⁴⁰⁾
?Amarynodon sp. (= *Cadurcodon ardynensis* of Young)⁽²²⁷⁾⁽⁵²⁾
Sianodon sinensis (Zdansky, 1930)⁽²²⁷⁾⁽²³⁵⁾⁽⁶²⁾

Order Artiodactyla Owen, 1848
 Family Anthracotheriidae Gill, 1872
Anthracokeryx sinensis (Zdansky, 1930)⁽⁵²⁾⁽²¹³⁾⁽²³⁵⁾
Anthracokeryx cf. *sinensis* (Zdansky, 1930)⁽⁵²⁾⁽²¹³⁾⁽²³⁵⁾

artiodactyl indet. (= "*Hoanghoniuss stehlini*," No. 2 of Wood and Chow)⁽²⁰²⁾⁽⁶⁷⁾

Ren-cun Member:
 Order Primates Linnaeus, 1758
 Family Omomyidae Trouessart, 1879
Hoanghoniuss stehlini Zdansky, 1930⁽²³⁵⁾⁽²⁰²⁾⁽⁶⁷⁾⁽⁵²⁾ [5311-14]

Order Rodentia Bowdich, 1821
 Family Yuomyidae Dawson, Li, and Qi, in press
Yuomys cavioides Li, 1975⁽⁵²⁾⁽¹⁰⁸⁾ [5313-14]

Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
Honanodon hebetis Chow, 1965⁽⁴⁰⁾⁽⁵²⁾ [5314]

Order Tillodontia Marsh, 1875
 Family Tillotheriidae Marsh, 1875
Adapidium huanghoense Young, 1937⁽²²⁷⁾⁽⁷⁹⁾⁽³⁷⁾ [F12]
 Tillodontia gen. et sp. indet.⁽³⁷⁾⁽⁵²⁾ [5313]

Order Perissodactyla Owen, 1848
 Family ?Lophialetidae Radinsky, 1965
?Rhodopagus sp.⁽²³⁵⁾⁽¹⁵⁸⁾
 Family Deperetellidae Radinsky, 1965

Deperetella depereti (Zdansky, 1930)⁽²³⁵⁾⁽¹⁵⁸⁾⁽²²⁷⁾ [F12, Loc. 7]

Diplolophodon (Deperetella) similis Zdansky, 1930⁽²³⁵⁾⁽⁷⁵⁾⁽²²⁷⁾ [F12, F23]

Family Hyracodontidae Cope, 1879

Caenolophus cf. promissus Matthew and Granger, 1925⁽²²⁷⁾⁽¹⁵⁸⁾ [F12, F23]

Family Aymynodontidae Scott and Osborn, 1883

Sianodon sinensis Chow and Xu, 1965⁽⁶²⁾

Sianodon mienchiensis Chow and Xu, 1965⁽⁶²⁾ [5314]

Amynodon mongoliensis Osborn, 1936⁽²²⁷⁾⁽¹⁴⁰⁾ [F12, F22]

Family Rhinocerotidae Owen, 1845

Prohyracodon cf. meridionalis Chow and Xu, 1961⁽⁵²⁾⁽⁶¹⁾ [5312, 5314]

Family Eomoropidae Viret, 1958

Eomoropus quadridentatus Zdansky, 1930⁽²³⁵⁾⁽⁹⁰⁾⁽¹⁵⁶⁾ [Loc. 7, Er-lang-gou]

Grangeria ?major (Zdansky, 1930)⁽²³⁵⁾⁽¹⁵⁶⁾ [Loc. 7]

Order Artiodactyla Owen, 1848

Family Dichobunidae Gill, 1872

?Dichobune sp.⁽⁵²⁾

Family Choeropotamidae Owen, 1845

Gobiohyus yuanchuensis Young, 1937⁽²²⁷⁾⁽⁵²⁾ [F11, F12]

Family Anthracotheriidae Gill, 1872

Anthracothema minima Xu, 1962⁽²¹³⁾⁽⁵²⁾ [5313]

Anthracokeryx sinensis (Zdansky, 1930)⁽²³⁵⁾⁽²¹³⁾ [5311–14]

Anthracosenex ambiguus Zdansky, 1930⁽²³⁵⁾⁽²²⁷⁾ [Loc. 7, F12]

VII. He-nan (Honan) Province

14. Tan-tou Basin

For the location and the stratigraphic sequence of the Basin see Section 1-6.

The list of the mammalian fauna of Tan-tou Formation (Early Eocene):

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

Prodinoceratinae gen. et sp. indet.⁽¹⁸⁹⁾

Order Pantodonta Cope, 1873

Family Archaeolambdidae Flerov, 1952

gen. et sp. indet.⁽¹⁸⁹⁾

15. Ji-yuan (Chiyuan) Basin

Liu Hsien-ting et al., 1963⁽¹¹²⁾

Chow Min-chen, Li Chuan-kuei, and Chang Yu-ping, 1973⁽⁵²⁾

a. Location: Ji-yuan County, north bank of the Yellow River, He-nan Province.

Coordinates: 35°08'N; 112°35'E (Ji-yuan city)

b. Stratigraphic Sequence:

Ji-yuan Formation (new) (Late Eocene)

Red clays, brown-red sandstone, sandy clays, and conglomerate (500 m).

—Unconformity—

Jurassic

c. The list of the mammalian fauna:

Ji-yuan Formation (Late Eocene)

Order Rodentia Bowdich, 1821

Family Yuomyidae Dawson, Li, and Qi, in press

Yuomys cavioides Li, 1975⁽⁵²⁾⁽¹⁰⁸⁾

Order Perissodactyla Owen, 1848

Family Aymynodontidae Scott and Osborn, 1883

Sianodon chiyuanensis Chow and Xu, 1965⁽⁶²⁾

Sianodon sinensis (Zdansky, 1930)⁽⁶²⁾⁽²³⁵⁾

Lushiamynodon obesus Chow and Xu, 1965⁽⁶²⁾

16. Ling-bao Basin

Chow Min-chen, Li Chuan-kuei, and Chang Yu-ping, 1973⁽⁵²⁾

Tong Yong-sheng and Wang Jing-wen, 1980⁽¹⁸⁹⁾

a. Location: 50 km north of Lu-shi city and south bank of Yellow River.

Coordinates: 34°34'N; 110°42'E (Ling-bao city)

b. Stratigraphic Sequence:

Hun-shui-he Formation (Late Eocene) (200 m)

Upper: Greyish green, reddish brown mudstones with intercalating sandstones.

Middle: Greyish brown sandy mudstones, sandstones.

Lower: Reddish brown mudstones with intercalating sandstone and gravels.

Chuan-kou Formation (Late Middle Eocene or Early Late Eocene)

Purplish red sandy mudstones and conglomerates.

Xiang-cheng Group (Paleocene to Eocene)

Purplish red silty mudstones, sandstones etc. No fossils. (700 m)

Nan-chao Formation (Cretaceous)

Red clays, containing *Macroblithes yaotunensis*.

c. The list of the mammalian fauna:

Hun-shui-he Formation (Late Eocene)

Order Perissodactyla Owen, 1848

Family Brontotheriidae Marsh, 1873

gen. et sp. indet.⁽¹⁸⁹⁾

Family Hyracodontidae Cope, 1879

Caenolophus sp.⁽¹⁸⁹⁾

Family Aymynodontidae Scott and Osborn, 1883

Aymynodontidae indet.⁽¹⁸⁹⁾

Order Artiodactyla Owen, 1848

Family Anthracotheriidae Gill, 1872

gen. et sp. indet.⁽¹⁸⁹⁾

Family Hypertragulidae Cope, 1879

Archaemeryx sp.⁽¹⁸⁹⁾

Chuan-kou Formation (Middle Eocene to Late Eocene)

Order Perissodactyla Owen, 1848

Family Helaletidae Osborn, 1892

Hyrachyus sp.⁽⁵²⁾⁽¹⁸⁹⁾

?Family Aymynodontidae Scott and Osborn, 1883

?*Sianodon* sp.⁽¹⁸⁹⁾

17. Lu-shi Basin

Teilhard de Chardin, P., G. B. Barbour, and M. N. Bien, 1935⁽¹⁷⁹⁾

Lee Yue-yen, 1938⁽¹⁰²⁾

Li Chuan-kuei, 1957⁽¹⁰⁴⁾

Chow Min-chen, Li Chuan-kuei, and Chang Yü-ping, 1973⁽⁵²⁾

Tong Yong-sheng and Wang Jing-wen, 1980⁽¹⁸⁹⁾

- a. Location: Lu-shi County, on the northern slope of the east part of Tsin-ling Mountain. Length: 30 km, Width: 7–15 km.

Coordinates: 34°04'N; 110°02'E (Lu-shi city)

The main fossil locality, Men-chia-pu, or Field no. 57202, is about 1.5 km southwest of the city of Lu-shi. Almost all the fossils are from a patch of sediments which is the filling of a sinkhole in the limestone on an erosional surface antecedent to the deposition of the Lu-shi Formation.

- b. Stratigraphic Sequence:

Da-yu Formation (?Oligocene)

Red conglomerates, light colored mudstones and greenish shales; no mammalian fossils (800 m).

Chu-gou-yu Formation (Late Late Eocene)

Greyish green calcareous mudstone, sandy mudstone with intercalating greyish yellow, coarse sandstone (700 m).

Lu-shi Formation (Early Late Eocene)

Dark red mudstones, brown, grey-white marls, red conglomerates (400 m).

- c. The list of the mammalian fauna [57202 Quarry]:

Lu-shi Formation (Early Late Eocene)

Order Primates Linnaeus, 1758

Family Anaptomorphidae Cope, 1883

Lushius qinlinensis Chow, 1961⁽³⁴⁾

Order Lagomorpha Brandt, 1855

Family Leporidae Gray, 1821

Lushilagus lohoensis Li, 1965⁽¹⁰⁷⁾

Order Rodentia Bowdich, 1821

Family Cocomyidae Dawson, Li, and Qi, in press

Tsinlingomys youngi Li, 1963⁽¹⁰⁶⁾

Order Creodonta Cope, 1875

Family Hyaenodontidae Leidy, 1869

Propterodon iridinensis Matthew and Granger, 1925⁽⁴¹⁾⁽¹²⁵⁾

Order Carnivora Bowdich, 1821

Family Miacidae Cope, 1880

Miacis lushiensis Chow, 1975⁽⁴¹⁾⁽⁵²⁾

Family Canidae Gray, 1821

Cynodictis sp.⁽⁵²⁾

Family Felidae Gray, 1821

cf. *Eusmilus* sp.⁽⁵²⁾⁽³¹⁾

Order Condylarthra Cope, 1881

Family Arctocyonidae Murray, 1866

Paratriisodon henanensis Chow, 1959⁽²⁹⁾

Paratriisodongigas Chow, Li, and Chang, 1973⁽⁵²⁾

Family Mesonychidae Cope, 1875

Honanodon macrodontus Chow, 1965⁽⁴⁰⁾⁽¹⁶⁸⁾

Lohoodon lushiensis (Chow, 1965)⁽⁴⁰⁾⁽⁵²⁾⁽¹⁶⁸⁾

Order Taeniodonta Cope, 1876

Family Stylinodontidae Marsh, 1875

?*Stylinodon* sp.⁽⁵²⁾⁽³⁷⁾

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Eudinoceras sp.⁽⁵²⁾

Order Perissodactyla Owen, 1848

Family Brontotheriidae Marsh, 1873

?*Microtitan* sp. (or new genus)⁽⁵²⁾

Protitan grangeri (Osborn, 1925)⁽⁵²⁾⁽⁸⁷⁾

Family Lophialetidae Radinsky, 1965

Breviodon minutus (Matthew and Granger, 1925)⁽⁵²⁾⁽¹⁵⁸⁾

Family Helaletidae Osborn, 1892

?*Colodon* sp.⁽⁵²⁾

Family Deperetellidae Radinsky, 1965

Deperetella sp.⁽⁵²⁾

Family Hyracodontidae Cope, 1879

Caenolophus sp. (or Amynodontidae)⁽⁵²⁾⁽¹⁵⁹⁾

Family Amynodontidae Scott and Osborn, 1883

Lushiamynodon menchiapuensis Chow and Xu, 1965⁽⁶²⁾⁽⁵²⁾

Sianodon honanensis Chow and Xu, 1965⁽⁶²⁾⁽⁵²⁾

Family Rhinocerotidae Owen, 1845

Prohyracodon sp.⁽⁵²⁾

Forstercooperia spp.⁽⁵²⁾

Family Eomoropidae Viret, 1958

Lunania youngi Chow, 1957⁽²³⁾⁽¹⁵⁶⁾⁽⁵²⁾

Eomoropus sp.⁽⁵²⁾

Order Artiodactyla Owen, 1848

Family Diehobunidae Gill, 1872

Dichobune sp.⁽⁵²⁾

Family Choeropotamidae Owen, 1845

Gobiohyus orientalis Matthew and Granger, 1925⁽⁵²⁾⁽¹²⁵⁾

Gobiohyus robustus Matthew and Granger, 1925⁽⁵²⁾⁽¹²⁵⁾

Family Anthracotheriidae Gill, 1872

Anthracotherium spp.⁽⁵²⁾

Tong and Wang (1980:23) reported that two new Eocene mammalian horizons have been discovered in recent years. One is beneath the main fossils quarry [57202], yielding *Lophialetes*, *Eudinoceras*(?), mesonychid, Uintatheriinae, *Gobiohyus* and *Breviodon* etc. The others occurred in the Chu-gou-yu Formation (Late Eocene), containing Sciuravidae gen. et sp. nov., *Yuomys* sp. nov., Palaeolaginae indet., *Eomoropus major*, *Breviodon* sp. nov., *Forstercooperia* sp., *Archaeomeryx optatus* etc.

18. Wu-cheng Basin

Gao Yu, 1976⁽⁷⁸⁾

Wang Jing-wen, 1978⁽²⁰⁰⁾

- a. Location: Tong-bai County, He-nan Province.

Coordinates: 32°25'N; 113°30'E (Wu-cheng town)

(Fig. 11)

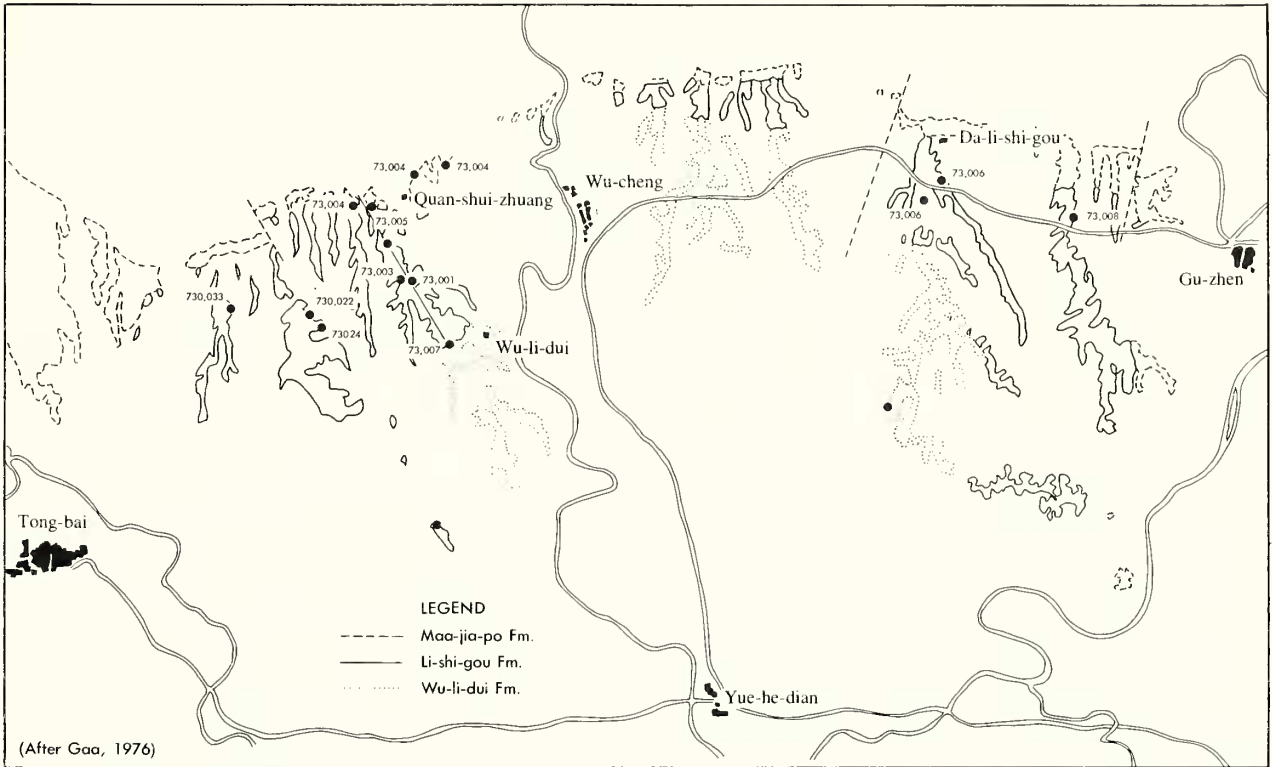


Fig. 11.—Map of the fossil localities of Wu-cheng Basin. (Scale 1:50,000)

b. Dimension: About 250 km².

c. Stratigraphic Sequence:

Wu-li-dui Formation (Late Eocene)

Thin greyish green mudstones interbedded with brownish grey kerogen shales (550 m).

—Conformity—

Li-shi-gou Formation (Late Eocene)

Brownish yellow conglomeratic sandstones and greyish green sandy mudstones (370 m).

—Conformity—

Mao-jia-po Formation (Late Eocene)

Greyish red breccia and sandy mudstone and marls.

d. The list of the mammalian fauna:

Wu-li-dui Formation (Late Eocene)

Order Perissodactyla Owen, 1848

Family Hyracodontidae Cope, 1879

Imequincisoria mazhuangensis Wang, 1976⁽¹⁹⁹⁾

Imequincisoria micracis Wang, 1976⁽¹⁹⁹⁾

Imequincisoria(?) sp.⁽¹⁹⁹⁾

Family Amynodontidae Scott and Osborn, 1883

Gigantamynodon sp.⁽²⁰⁰⁾

cf. *Lushiamynodon* sp.⁽⁷⁸⁾

Sianodon sinensis (Zdansky, 1930)⁽²⁰⁰⁾⁽⁷⁸⁾

Family Rhinocerotidae Owen, 1845

Juxia spp. nov.⁽⁷⁸⁾

Forstercooperiinae indet.⁽⁷⁸⁾

Li-shi-gou Formation (Late Eocene)

Order Rodentia Bowdich, 1821

Family Yuomyidae Dawson, Li, and Qi, in press

Yuomys elegans Wang, 1978⁽²⁰⁰⁾⁽⁷⁸⁾

Order Creodonta Cope, 1875

Family Hyaenodontidae Leidy, 1869

Hyaenodon sp.⁽⁷⁸⁾

Order Carnivora Bowdich, 1821

Carnivora indet.⁽⁷⁸⁾

Order Perissodactyla Owen, 1848

Family Lophialetidae Radinsky, 1965

?*Breviodon* sp.⁽⁷⁸⁾

Lophialetidae gen. et sp. nov.⁽⁷⁸⁾

Family Deperetellidae Radinsky, 1965

Deperetella sp. nov.⁽⁷⁸⁾

Family Hyracodontidae Cope, 1879

Hyracodontidae gen. et sp. nov.⁽⁷⁸⁾

Family Amynodontidae Scott and Osborn, 1883

Lushiamynodon wuchengensis Wang, 1978⁽²⁰⁰⁾⁽⁷⁸⁾

Amynodon mongoliensis Osborn, 1936⁽²⁰⁰⁾⁽⁷⁸⁾

Amynodontidae indet.⁽⁷⁸⁾

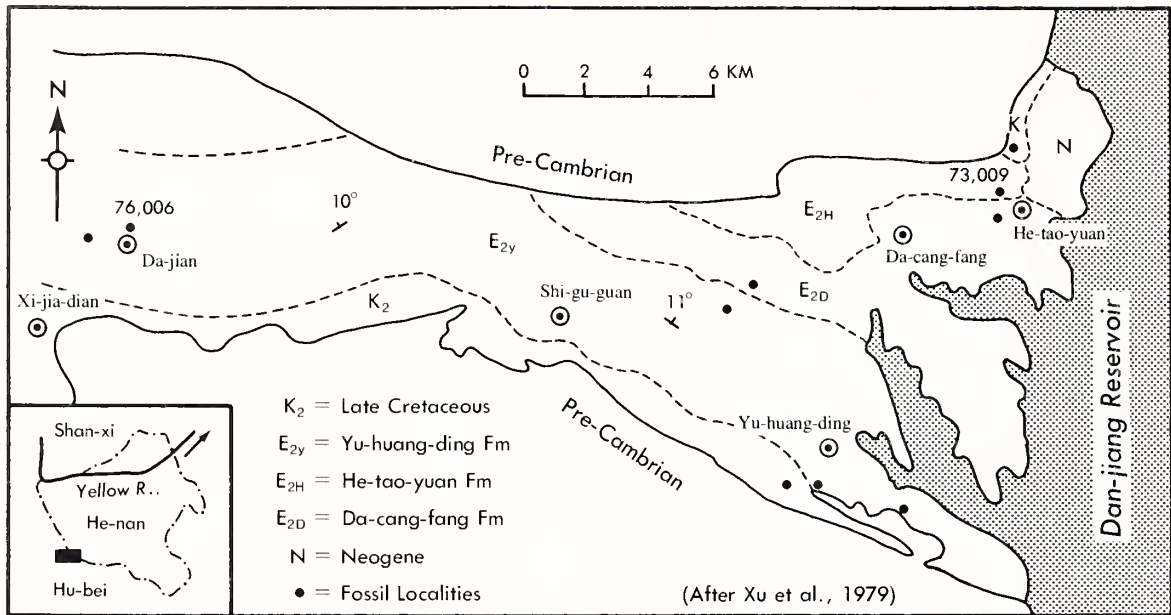


Fig. 12. — Map of the fossil localities of Xi-chuan Basin.

- Family Rhinocerotidae Owen, 1845
 Rhinocerotidae indet.⁽⁷⁸⁾
Pappaceras sp.⁽¹⁹⁹⁾
Forstercooperia sp. nov.⁽⁷⁸⁾
 Family Eomoropidae Viret, 1958
Eomoropus sp.⁽⁷⁸⁾
- Mao-jia-po Formation (Late Eocene)
 Order Perissodactyla Owen, 1848
 Family Deperetellidae Radinsky, 1965
Deperetella sp.⁽⁷⁸⁾
19. Xi-chuan (Sichuan) Basin
 Teilhard de Chardin, 1930⁽¹⁷⁸⁾
 Teilhard de Chardin, P., G. B. Barbour, and M. N. Bien, 1935⁽¹⁷⁹⁾
 Chow Min-chen, Li Chuan-kuei, and Chang Yu-ping, 1973⁽⁵²⁾
 Gao Yu, 1976⁽⁷⁸⁾
 Xu Yu-xuan, Yan De-fa, Zhou Shi-quan, Han Shi-jing, and Zhang Yong-cai, 1979⁽²²¹⁾
- a. Location: Southern slope of Tsinling Mountain, about 150 km south of Lu-shi Basin. Xi-chuan Basin (called also Li-quan-qiao [Li-kuan-chiao Basin]) extends from east of He-tao-yuan, a small village 45 km south of the Xi-chuan new city, He-nan Province, to the west of Xi-jia-dian, 20 km northwest of Jun-xian city, Hu-bei Province. Coordinates: 32°45'N; 110°40'–111°20'E; 32°46'N; 111°27'E (Li-quan-quao town) (Fig. 12)
- b. Dimension: Length: more than 40 km (E–W); Width: 10 km (N–S, at maximum).
- c. Stratigraphic Sequence:
 He-tao-yuan Formation (Early Late Eocene)
 Greyish green mudstones with intercalating marls, sandstones and conglomerates (800 m).
- Conformity—
 Da-cang-fang Formation (Middle Eocene)
 Greyish white, brownish yellow sandstones, conglomerates and red sandy mudstone (500–1,100 m).
- Conformity—
 Yu-huang-ding Formation (Late Early Eocene or Early Middle Eocene) Light red, white mudstone with intercalating purple-red or green marls (400–900 m).
- Disconformity—
 Hu-gang Formation (Cretaceous)
- d. The list of the mammalian fauna:
 He-tao-yuan Formation (Early Late Eocene)
 Order Edentata Cuvier, 1798
 Superfamily Megalonychoidea Simpson, 1931
Chungchienia sichuanica Chow, 1963⁽³⁸⁾
 Order Rodentia Bowdich, 1821
 Family Cocomyidae Dawson, Li, and Qi, in press
 gen. et sp. indet. (“*Sciuravus*” sp.)⁽¹⁰⁶⁾⁽⁷⁰⁾
 Order Creodonta Cope, 1875
 Family Oxyaenidae Cope, 1877
Prolaena parva Xu et al., 1979⁽²²¹⁾
 Family Hyaenodontidae Leidy, 1869
 ?“*Sinopa*” sp.⁽⁷⁸⁾
 ?“*Tritemnodon*” sp.⁽⁷⁸⁾
 Order Carnivora Bowdich, 1821
 Family Miacidae Cope, 1880
Miacis lushiensis Chow, 1975⁽²²¹⁾⁽⁴¹⁾

- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
?Andrewsarchus sp.⁽⁷⁸⁾⁽¹³⁶⁾
- Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
?Protitan sp.⁽²²¹⁾
- Family Lophialetidae Radinsky, 1965
Lophialetes expeditus Matthew and Granger, 1925⁽²²¹⁾⁽¹²⁶⁾
Lophialetes sp.⁽¹⁷⁸⁾
Breviodon cf. *minutus* (Matthew and Granger, 1925)⁽²²¹⁾⁽¹⁵⁸⁾
- Family Depereteliidae Radinsky, 1965
Teleolophus sichuanensis Xu et al., 1979⁽²²¹⁾
Teleolophus cf. *medius* Matthew and Granger, 1925⁽²²¹⁾
- Family Helaletidae Osborn, 1892
?Colodon sp.⁽⁵²⁾⁽⁷⁸⁾
- Family Aynodontidae Scott and Osborn, 1883
Sianodon sp.⁽²²¹⁾⁽²¹⁴⁾
- Family Rhinocerotidae Owen, 1845
Prohyracodon sp.⁽²²¹⁾
- Da-cang-fang Formation (Middle Eocene)
- Order Rodentia Bowdich, 1821
 Family Cocomyidae Dawson, Li, and Qi, in press
 gen. et sp. indet.⁽²²¹⁾
- Order Carnivora Bowdich, 1821
 gen. et sp. indet.⁽⁷⁸⁾
- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
 gen. et sp. indet.⁽²²¹⁾
- Order Pantodonta Cope, 1873
 Family Coryphodontidae Marsh, 1876
 gen. et sp. indet.⁽²²¹⁾
- Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
 cf. *Palaeosyops* sp.⁽²²¹⁾
- Family ?Lophialetidae Radinsky, 1965
 gen. et sp. indet. (cf. *Breviodon*, V5372)⁽²²¹⁾
- Family Aynodontidae Scott and Osborn, 1883
Euryodon minimus Xu et al., 1979⁽²²¹⁾
- Yu-huang-ding Formation (Late Early Eocene or Early Middle Eocene)
- Order Anagalida Szalay and McKenna, 1971
 Family Eurymylidae Matthew, Granger, and Simpson, 1929
Rhombomylus sp.⁽²²¹⁾
- Order Rodentia Bowdich, 1821
 Family Cocomyidae Dawson, Li, and Qi, in press
Adenimus hupeiensis Dawson, Li, and Qi, in press⁽⁷⁹⁾
- Order Pantodonta Cope, 1873
 Family Coryphodontidae Marsh, 1876
Asiocoryphodon conicus Xu, 1976⁽²²¹⁾⁽²¹⁶⁾
Asiocoryphodon lophodontus Xu, 1976⁽²²¹⁾⁽²¹⁶⁾
- Coryphodon jlerowi* Chow, 1957⁽²²¹⁾⁽²⁴⁾⁽²¹⁶⁾⁽¹⁸⁶⁾
Manteodon cf. *youngi* Xu, 1980⁽²²¹⁾⁽¹⁸¹⁾
- Order Dinocerata Marsh, 1873
 Family Uintatheriidae Flower, 1876
?Gobiatherium sp.⁽⁵⁶⁾
- Order Perissodactyla Owen, 1848
 Family Helaletidae Osborn, 1892
 cf. *Heptodon* sp.⁽²²¹⁾
- VIII. Hu-bei (Hupei) Province
20. Jun-xian Basin (see Section 2-19, Xi-chuan Basin)
21. Yi-chang (Ichang) District
 Teilhard de Chardin, P., and Young Chung-chien, 1936⁽¹⁸¹⁾
 Xu Yu-xuan, 1980⁽²¹⁸⁾
- a. Location: Yang-xi located on the south bank of the Yang-tze River and 20 km SE of the Yidu city (about 75 km SSE of the Yichang city), Hu-bei Province.
 Coordinates: 30°24'N; 111°26'E (Yidu city)
 Mei-zi-xi: on the north bank of the Yang-tze River, just opposite to the Yidu city of south bank.
- b. Stratigraphic Sequence:
 Dong-hu Formation (Late Early Eocene or Early Middle Eocene)
 Mainly red conglomerates, sandstones and marls.
- c. The list of the mammalian fauna:
 Dong-hu Formation (Late Early Eocene or Early Middle Eocene)
 Order Pantodonta Cope, 1873
 Family Coryphodontidae Marsh, 1876
Manteodon youngi Xu, 1980⁽²¹⁸⁾ (containing *Eudinoceros* cf. *kholobochiensis* of Teilhard de Chardin and Young⁽¹⁸¹⁾)
- IX. An-hui (Anhui) Province
22. Lai-an Basin
 Zhai Ren-jie, Bi Zhi-quo and Yu Zhen-jiang, 1976⁽²⁴⁰⁾
- a. Location: About 15 km NE of Lai'-an city, Lai'-an County, An-hui Province.
 Coordinates: 32°27'N; 118°25'E (Lai'-an city)
- b. Stratigraphic Sequence:
 Huang-gang Formation (Pliocene)
 Greyish yellow basalt.
- Unconformity—
- Zhang-shan-ji Formation (?Early Eocene)
 Brick-reddish thick sandy and calcareous mudstone with coarse sand and fine conglomerate (100 m).
- Disconformity—
- Shun-shan-ji Formation (Paleocene)
 Greyish red silt marls.
- c. The list of the mammalian fauna:
 Zhang-shan-ji Formation (?Early Eocene)
 Order Anagalida Szalay and McKenna, 1971
 Family Eurymylidae Matthew, Granger, and Simpson, 1929
Rhombomylus laianensis Zhai, Bi, and Yu, 1976⁽²⁴⁰⁾

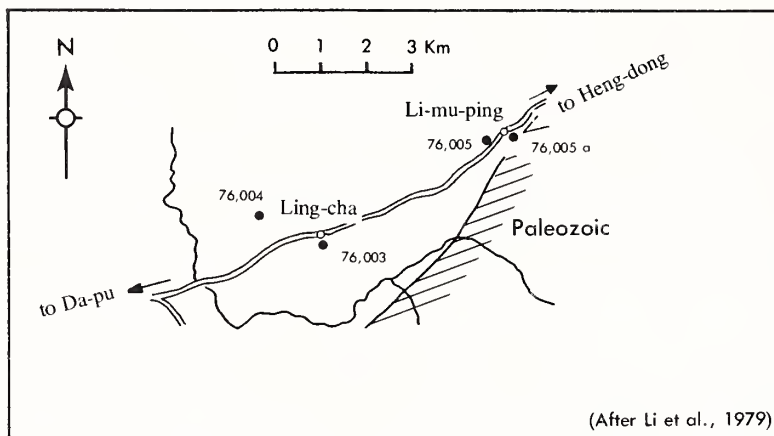


Fig. 13.—Map of the fossil mammalian localities of Heng-yang Basin.

X. Jiang-xi (Kiangsi) Province

23. Chi-jiang (Chihkiang) Basin

a. Location, Dimension, and Stratigraphic Sequence:
See description in the Paleocene of Chi-jiang Basin
(Section 1-2).

b. The list of the mammalian fauna:

Ping-hu Formation (Early Eocene)

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

Phenaceras lacustris Tong, 1979⁽¹⁸⁵⁾
[72027]

Ganatherium australis Tong, 1979⁽¹⁸⁵⁾
[72027]

24. Yuan-shui Basin

Chow Min-chen, 1959⁽³⁰⁾⁽⁵⁶⁾

Chang Yu-ping and Tung Yung-sheng, 1963⁽¹²⁾

Zheng Jia-jian, Tung Yung-sheng, and Chi Hung-
xiang, 1975⁽²⁵⁷⁾

a. Location: About 30 km east of Xin-yu city, Jiang-
xi Province.

Coordinates: 27°52'N; 114°55'E (Xin-yu city)

b. Stratigraphic Sequence:

Lin-jiang Formation (?Oligocene)

Brownish red and black mudstone and shales
with intercalating marls (360–400 m).

—?Disconformity—

Xin-yu Group (Eocene)

Upper Member: Purplish, brownish and grey-
ish mudstone and sandstone (500 m).

Ning-jia-shan Member (Early Eocene): Pur-
plish grey argillaceous sandstone and sandy
mudstone with intercalating greyish green
fine sandstone and calcareous nodules (600–
900 m).

—?Disconformity—

Qing-feng-qiao Formation (?Late Cretaceous)

Purplish red thick conglomerate rock with argil-
laceous sandstone (> 100 m).

c. The list of the mammalian fauna:

Ning-jia-shan Member (Early Eocene)

Order Carnivora Bowdich, 1821

Family Miacidae Cope, 1880

Xinyuictis tenuis Zheng, Tung, and Chi,
1975⁽²⁵⁷⁾ [72041]

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Coryphodon ninchiashanensis Chow and
Tung, 1965⁽⁵⁷⁾ [72041]

Order Dinocerata Marsh, 1873

Family Uintatheriidae Flower, 1876

?*Probathyopsis sinyuensis* Chow and
Tung, 1962⁽⁵⁶⁾ [72041]

Order Perissodactyla Owen, 1848

Family Heleatidae Osborn, 1872

?*Heptodon* sp.⁽²⁵⁷⁾ [72041]

XI. Hu-nan (Hunan) Province

25. Heng-yang Basin

Young Chung-chien, Bien Mei-nian, and Lee Yue-
yen, 1938⁽²³²⁾

Young Chung-chien, 1944⁽²²⁸⁾

Li Chuan-kuei, Chiu Chan-siang, Yan De-fa, and
Hsieh Shu-hua, 1979⁽¹¹⁰⁾

a. Location: About 15 km SW of Heng-dong city,
Heng-dong County, Hu-nan Province.

Coordinates: 27°05'N; 112°57'E (Heng-dong city)
(Fig. 13)

b. The list of the mammalian fauna:

Ling-cha Formation (Early Eocene)

Order Insectivora Bowdich, 1821

Family indet.

gen. et sp. nov.⁽¹¹⁰⁾

Order Anagalida Szalay and McKenna, 1971

Family Eurymylidae Matthew, Granger,
and Simpson, 1929

Matutinia nitidulus Li, Chiu, Yan, and
Hsien, 1979⁽¹¹⁰⁾ [76004]

Order Rodentia Bowdich, 1821

Family Paramyidae Miller and Gidley,
1918

Cocomys lingchaensis (Li, Chiu, Yan, and
Hsien, 1979)⁽¹¹⁰⁾ [76003]

Order Pantodonta Cope, 1873

Family Coryphodontidae Marsh, 1876

Asiocoryphodon sp.⁽¹¹⁰⁾ [76003]

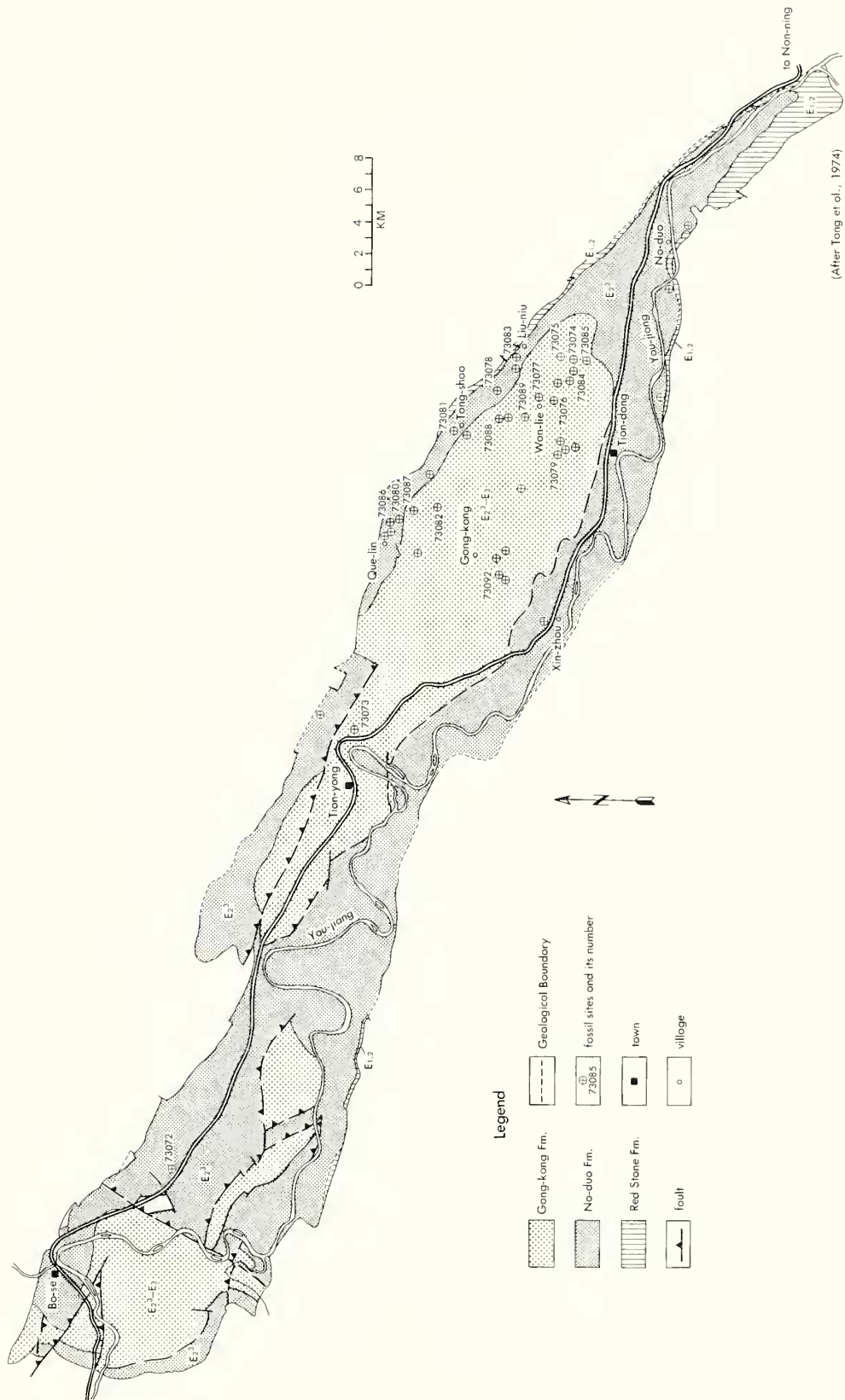


Fig. 14.—Map of the distribution of Lower Tertiary and the fossil localities of Bo-se Basin.

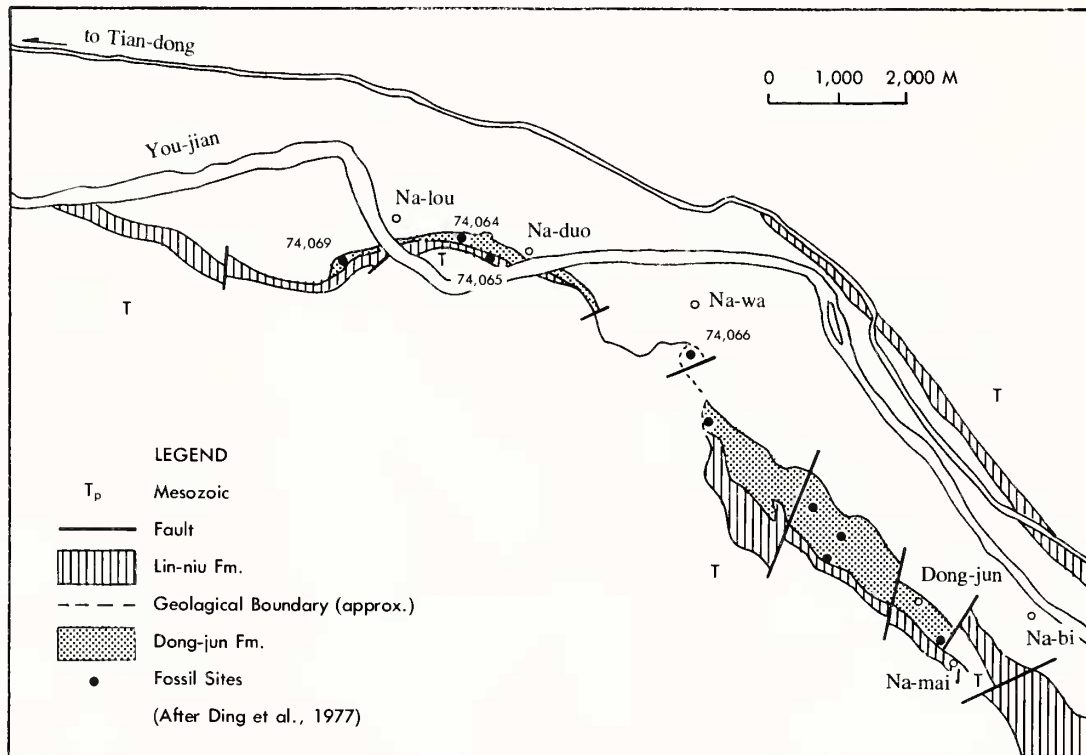


Fig. 15.—Map of the distribution of Dong-jun Formation and the fossil localities of Bo-se Basin.

Order Perissodactyla Owen, 1848

Family Equidae Gray, 1821

Propachynolophus hengyangensis
(Young, 1944)⁽¹¹⁰⁾⁽²²⁸⁾ [76003]

Mammalia, Order indet.

Family Didymoconidae Kretzoi, 1943

Hunaniactis inexpectatus Li, Chiu, Yan,
and Hsien, 1979⁽¹¹⁰⁾ [76004]

?Paleocene⁸

Order Pantodonta Cope, 1873

Family Archaeolambdidae Flerov, 1952

Archaeolambda sp.⁽¹¹⁰⁾ [76005^a, 76005]

XII. Guang-xi (Kwangsi) Region

26. Bo-se Basin

Chow Min-chen, 1956⁽²⁰⁾

Tang Xin and Chow Min-chen, 1964⁽¹⁷¹⁾

Tang Ying-jun, You Yü-zhu, Xu Qin-qi, Qiu Zhu-
ding, and Hu Yan-kun, 1975⁽¹⁷⁶⁾

a. Location: Bo-se, Tian-dong and Tian-yang coun-
ties, Guang-xi Province.

Coordinates: 23°35'–23°50'N; 106°35'–107°10'E
(Figs. 14, 15)

b. Dimensions: 90 km (NW–SE); 15 km (NE–SW,
at maximum) (800 km²).

c. Stratigraphic Sequence:

Gung-kang Formation (Early Oligocene)

Yellowish and greyish green mudstone

interbedding with sandy mudstone and
sandstone [73092, 74067, 73075, 73984,
73988, 73989] (1,300–1,459 m).

—Conformity—

Na-duo Formation (Late Late Eocene)

Upper Coal Member: Greyish green mudstone
and sandy mudstone with intercalating coal
and sand-conglomerate rock.

Lower Coal Member: Greyish green silt sand-
stone with intercalating carbonaceous
mudstone, sandy marls and several coal
beds [73072, 73078, 73080, 73081, 73086,
73088, 74067].

—Disconformity—

Dong-jun Formation (Early Late Eocene)

Upper part: Greyish yellow and white calcar-
eous mudstone and greyish red marls;

Lower part: Greyish white limestone marls and
rudaceous limestone; [74064, 74066,
74069] (20–50 m).

—Disconformity—

Liu-niu Formation (?Eocene)

Brown red sandy mudstone, argillaceous sand-
stone interbedding with conglomerate rock
(60 m).

—Unconformity—

Mesozoic

⁸ *Archaeolambda* sp. (V5345, V5344) was found in the purplish red mudstone which
was underneath Ling-cha Formation and might be assigned to Paleocene.

d. The list of the mammalian fauna:

- Na-duo Formation (Late Late Eocene)
- Order Creodonta Cope, 1875
creodont indet.⁽²³⁾⁽¹⁷¹⁾
- Order Condylarthra Cope, 1881
Family Mesonychidae Cope, 1875
Guilestes acares Zheng and Chi, 1978⁽²⁵³⁾
Guilestes cf. *acares* Zheng and Chi, 1978⁽²⁵³⁾
cf. *Harpagolestes* sp.⁽²⁵³⁾
- Family Phenacodontidae Cope, 1881
Eodesmatodon spanios Zheng and Chi, 1978⁽²⁵³⁾
- Order Perissodactyla Owen, 1848
Family Brontotheriidae Marsh, 1873
Metatelmatherium cf. *browni* Colbert, 1938⁽²³⁾⁽¹⁷¹⁾⁽⁶⁶⁾
- Family Deperetellidae Radinsky, 1965
Deperetella sp.⁽²³⁾⁽¹⁷¹⁾⁽¹⁷⁶⁾
- Family Hyracodontidae Cope, 1879
Caenolophus sp.⁽¹⁷⁶⁾
- Family Aymynodontidae Scott and Osborn, 1883
Huananodon hui You, 1977⁽²²⁴⁾⁽¹⁷⁶⁾
Paramynodon cf. *birmanicus* (Pilgrim and Cotter, 1916)⁽¹⁷⁶⁾
Aymynodontidae indet.⁽²³⁾⁽¹⁷¹⁾
- Family Rhinocerotidae Owen, 1845
Guixia simplex You, 1977⁽²²⁴⁾⁽¹⁷⁶⁾ [73081]
- Family Eomoropidae Viret, 1958
Eomoropus cf. *quadridentatus* Zdansky, 1930⁽²³⁾⁽¹⁷¹⁾⁽²³⁵⁾
- Order Artiodactyla Owen, 1848
Family Entelodontidae Lydekker, 1883
Entelodontidae indet.⁽¹⁷⁶⁾
- Family Anthracotheriidae Gill, 1872
Anthracothea rubricae Pilgrim, 1928⁽²³⁾⁽¹⁵⁴⁾⁽¹⁴⁵⁾ [73081, 74067]
Anthrakokeryx birmanicus Pilgrim and Cotter, 1916⁽¹⁵⁴⁾⁽²³⁾⁽¹⁷¹⁾ [73078, 73088]
Anthrakokeryx cf. *bambusae* Pilgrim, 1928⁽¹⁵⁴⁾⁽¹⁴⁵⁾ [73080]
Anthrakokeryx cf. *birmanicus* Pilgrim and Cotter, 1916⁽²³⁾⁽¹⁷¹⁾
Anthrakokeryx sp.⁽¹⁵⁴⁾⁽¹⁷⁶⁾
Bothriodon chyelingensis Xu, 1977⁽²¹¹⁾⁽¹⁷⁶⁾ [73086]
Huananothea imparilica Tang, 1978⁽¹⁷³⁾⁽¹⁷⁶⁾ [73086]
Heothema bellia Tang, 1978⁽¹⁷³⁾⁽¹⁷⁶⁾
Heothema sp.⁽¹⁷³⁾⁽¹⁷⁶⁾ [73078, 73080]
- Family Hypertragulidae Cope, 1879
Indomeryx cotteri Pilgrim, 1928⁽¹⁵⁵⁾⁽¹⁴⁵⁾ [73080, 73081, 73086]
Indomeryx youjiangensis Qiu, 1978⁽¹⁵⁵⁾⁽¹⁷⁶⁾ [73086]
Indomeryx sp.⁽¹⁵⁵⁾⁽¹⁷⁶⁾ [73086]
Notomeryx besensis Qiu, 1978⁽¹⁵⁵⁾⁽¹⁷⁶⁾ [73072, 73086]
- Family Tragulidae Milne Edwards, 1865
Tragulidae indet.⁽²³⁾⁽¹⁷¹⁾
- Family Choeropotamidae Owen, 1845
Choeropotamidae gen. nov.⁽¹⁷⁶⁾
- Dong-jun Formation (Early Late Eocene)
- Order Carnivora Bowdich, 1821
Family Felidae Gray, 1821
?Eusmilus sp.⁽⁷⁵⁾ [74064]
- Order Condylarthra Cope, 1881
Family Mesonychidae Cope, 1875
Andrewsarchus crassum Ding, Zheng, Zhang, and Tong, 1977⁽⁷⁵⁾ [74069]
- Order Pantodonta Cope, 1873
Family Coryphodontidae Marsh, 1876
Eudinoceras crassum Tong and Tang, 1977⁽¹⁸⁶⁾
- Order Perissodactyla Owen, 1848
Family Brontotheriidae Marsh, 1873
cf. *Protitan* sp.⁽⁷⁵⁾ [74069]
- Family Deperetellidae Radinsky, 1965
Diplophodon cf. *similis* Zdansky, 1930⁽⁷⁵⁾⁽²³⁵⁾⁽¹⁵⁸⁾ [74066]
Teleolophus sp.⁽⁷⁵⁾ [74066]
- Family Aymynodontidae Scott and Osborn, 1883
cf. *Gigantamynodon* sp.⁽⁷⁵⁾ [74066]
Aymynodon sp.⁽⁷⁵⁾ [74066]
cf. *Paramynodon* sp.⁽⁷⁵⁾ [74066]
- Family Rhinocerotidae Owen, 1845
Prohyracodon sp.⁽⁷⁵⁾ [74066]
?Thianodon sp.⁽⁷⁵⁾ [74064]
Forstercooperia spp.⁽⁷⁵⁾ [74066, 74069]
- Order Artiodactyla Owen, 1848
Family Anthraeotheriidae Gill, 1870
?Probrachyodus sp.⁽⁷⁵⁾ [74066]

XIII. Yun-nan (Yunnan) Province

27. Lu-nan Basin

- Young Chung-chien and Bien Mei-nian, 1939⁽²³⁰⁾
Chow Min-chen, 1957⁽²³⁾, 1958⁽²⁵⁾
Xu Yu-xuan and Chiu Chan-siang, 1962⁽²¹⁹⁾
Zheng Jia-jian, Tang Ying-jun, Zhai Ren-jie, Ding Su-yin, and Huang Xue-shi, 1978⁽²⁵⁵⁾
- a. Location: Lu-nan County, Yun-nan Province.
Coordinates: 24°47'N; 103°16'E (Lu-nan city)
(Fig. 16)
- b. Dimensions: 30 km long (N-S), 8 km wide (at maximum).
- c. Stratigraphic Sequence:
Xiao-tun Formation (Early Oligocene)
Brownish red argillaceous sandstone with intercalating sandy mudstone and greyish medium-coarse sandstone (40–50 m).
—?Conformity—
Lu-mei-yi Formation (Late Eocene)
Brownish red marls with intercalating greyish white calcareous and sandy mudstone (483–752 m).
—Unconformity—
Palaeozoic
- d. The list of the mammalian fauna:
Lu-mei-yi Formation (Late Eocene)

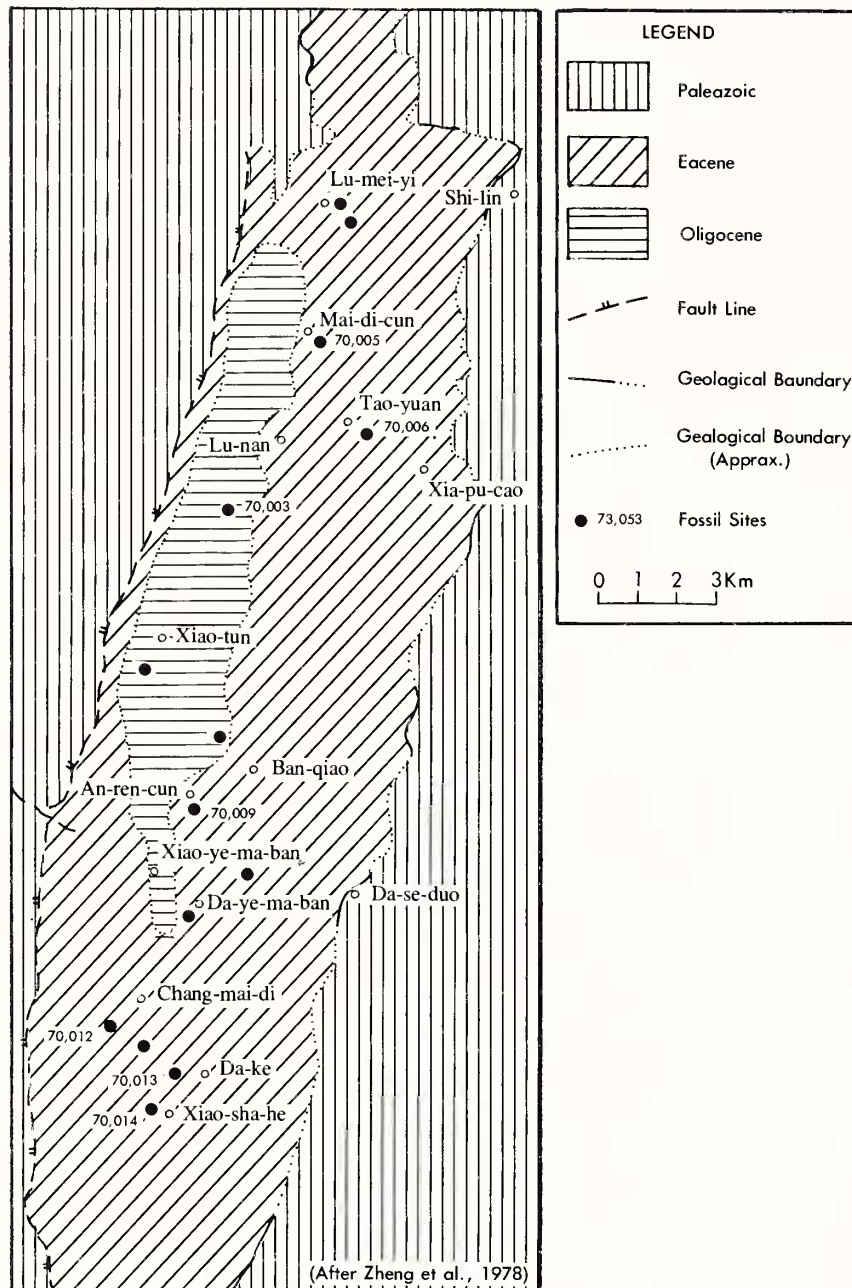


Fig. 16.—Map of the fossil localities of Lunan Basin.

(1) Lu-mei-yi—Lu-nan area (?Early Late Eocene)

Order Creodonta Cope, 1875

Creodonta indet.⁽²¹⁹⁾⁽²⁴⁷⁾

Order Carnivora Bowdich, 1821

Family Felidae Gray, 1821

Felidae indet.⁽²⁵⁵⁾⁽²⁴⁷⁾

Order Condylarthra Cope, 1881

Family Mesonychidae Cope, 1875

Honanodon sp.⁽²⁵⁵⁾⁽²⁴⁷⁾

Order Tillodontia Marsh, 1875

Tillodontia indet.⁽²⁵⁵⁾⁽²⁴⁷⁾

Order Perissodactyla Owen, 1848

Family Brontotheriidae Marsh, 1873

Protitan cf. *robustus* Granger and Gregory, 1943⁽²⁵⁵⁾⁽²⁴⁷⁾⁽⁸⁷⁾

Brontotheriidae gen. et sp. indet.⁽²⁵⁵⁾⁽²⁴⁷⁾

Rhinotitan sp.⁽²¹⁹⁾⁽²⁵⁵⁾⁽²³⁾

Family Lophialetidae Radinsky, 1965

Breviodon sp.⁽²⁵⁵⁾

Lophialetes expeditus Matthew and Granger, 1925⁽²⁵⁵⁾⁽¹²⁶⁾⁽²⁴⁷⁾

- ?Family Lophialetidae Radinsky, 1965
Rhodopagus pygmaeus Radinsky, 1965⁽²⁵⁵⁾⁽¹⁵⁸⁾
Rhodopagus sp.⁽²⁵⁵⁾
- Family Deperetellidae Radinsky, 1965
Deperetella sp.⁽²³⁾⁽²¹⁹⁾⁽²⁴⁷⁾
Teleolophus sp.⁽²¹⁹⁾
- Family Helaletidae Osborn, 1892
?Helaletes mongoliensis Osborn, 1923⁽²⁵⁵⁾⁽²⁴⁷⁾
- Family Hyracodontidae Cope, 1879
Teilhardia pretiosa Matthew and Granger, 1926⁽²⁵⁵⁾⁽¹²⁷⁾⁽²⁴⁷⁾
?Teilhardia sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
Caenolophus medius⁽²³⁾⁽²¹⁹⁾⁽²⁴⁷⁾
Caenolophus sp.⁽²¹⁹⁾⁽²⁵⁵⁾⁽²⁴⁷⁾
- Family Aymynodontidae Scott and Osborn, 1883
Lushiamynodon menchiapuensis Chow and Xu, 1962⁽⁶²⁾
Aymynodon sp. (cf. *sinensis*)⁽²¹⁹⁾
Aymynodon spp.⁽²⁵⁵⁾⁽⁶³⁾⁽²⁴⁷⁾
Aymynodon lunanensis Chow, Xu, and Zhen, 1964⁽⁶³⁾⁽²⁵⁵⁾⁽²⁴⁷⁾
- Family Rhinocerotidae Owen, 1845
Prohyracodon sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
Forstercooperia sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
- Family Eomoropidae Viret, 1958
Lunania youngi Chow, 1957⁽²³⁾⁽²¹⁹⁾⁽²⁵⁵⁾⁽²⁴⁷⁾⁽¹⁵⁸⁾
- Order Artiodactyla Owen, 1848
 Family Anthracotheriidae Gill, 1872
 Anthracotheriidae gen. et sp. indet.⁽²³⁾⁽²¹⁹⁾⁽²⁴⁷⁾
 Family Choeropotamidae Owen, 1845
Gobiohyus sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
- (2) An-yen-cun—Xiao-sha-he area (?Late Late Eocene)
- Order Creodonta Cope, 1875
 Family Hyaenodontidae Leidy, 1869
Pterodon dahkoensis Chow, 1975⁽⁴¹⁾
- Order Carnivora Bowdich, 1821
 Family Canidae Gray, 1821
 Canidae indet.⁽²⁷⁾⁽²¹⁹⁾⁽²⁴⁷⁾
Chailicyon crassidens Chow, 1975⁽⁴¹⁾
- Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
 Brontotheriidae indet.⁽²¹⁹⁾⁽²⁴⁷⁾
Rhinotitan quadridens Xu and Chiu, 1962⁽²¹⁹⁾⁽²⁴⁷⁾
Dianotitan lunanensis (Chow and Hu, 1958)⁽²¹⁹⁾⁽²⁵⁵⁾⁽⁴⁴⁾⁽⁴⁹⁾⁽²⁷⁾
 Brontotheriidae gen. et sp. indet.⁽²⁵⁵⁾⁽²⁴⁷⁾
- Family Lophialetidae Radinsky, 1965
Breviodon sahoensis Chow, Chang, and Ting, 1974⁽⁴⁴⁾⁽²⁵⁵⁾
- Family Deperetellidae Radinsky, 1965
Deperetella diensis Chow, Chang, and Ting, 1974⁽⁴⁴⁾
Diplophodon (*Deperetella*) cf. *similis* Zdansky, 1939⁽⁴⁴⁾⁽²³⁵⁾
- Teleolophus* cf. *magnus* Radinsky, 1965⁽¹⁵⁸⁾⁽⁴⁴⁹⁾
?Teleolophus sp.⁽²⁵⁵⁾
Teleolophus medius Matthew and Granger, 1956⁽¹²⁶⁾⁽²¹⁹⁾
- Family Aymynodontidae Scott and Osborn, 1883
Aymynodon altidens Xu and Chiu, 1962⁽²¹⁹⁾⁽²⁴⁷⁾
Aymynodon sp.⁽²¹⁹⁾⁽²⁴⁷⁾
 cf. *Metaymynodon* sp.⁽²¹⁹⁾⁽²⁴⁷⁾
 cf. *Paramynodon* sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
- Family Rhinocerotidae Owen, 1845
Prohyracodon progressa Chow and Xu, 1961⁽¹⁵⁹⁾⁽²¹⁹⁾⁽⁶¹⁾⁽⁴⁴⁾⁽²⁴⁷⁾
Prohyracodon meridionale Chow and Xu, 1961⁽⁶¹⁾⁽²⁵⁵⁾⁽⁴⁴⁾⁽²¹⁹⁾⁽²⁴⁷⁾
Prohyracodon cf. *orientale* Koch, 1897⁽¹⁵⁹⁾⁽²⁵⁵⁾⁽²⁴⁷⁾
Ilianodon lunanensis Chow and Xu, 1961⁽⁶¹⁾⁽²¹⁹⁾⁽²⁵⁵⁾
Forstercooperia shiwopuensis Chow, Chang, and Ting, 1974⁽⁴⁴⁾
Forstercooperia sp.⁽⁴⁴⁾
Juxia sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
 “*?Indricotherium*” sp.⁽²⁵⁵⁾⁽²⁴⁷⁾
Indricotherium parvum Chow, 1958⁽²⁷⁾⁽²¹⁹⁾
Indricotherium cf. *parvum* Chow, 1958⁽⁴⁴⁾
 Rhinocerotidae indet.⁽²¹⁹⁾⁽²⁴⁷⁾
- Family Eomoropidae Viret, 1958
Eomoropus ulterior Chow, 1962⁽³⁶⁾⁽²¹⁹⁾⁽²⁵⁵⁾
Eomoropus cf. *quadridentatus* Zdansky, 1930⁽³⁶⁾⁽²³⁵⁾
- Order Artiodactyla Owen, 1848
 Family Entelodontidae Lydekker, 1883
Eoentelodon yunnanense Chow, 1958⁽²¹⁹⁾⁽²⁵⁵⁾⁽²⁶⁾
- Family Anthracotheriidae Gill, 1872
Probrachyodus panchiaoensis Xu and Chiu, 1962⁽²¹³⁾⁽²¹⁹⁾
Brachyodus hui (Chow, 1958)⁽²¹³⁾⁽²⁷⁾
 Anthracotheriidae indet.⁽²¹³⁾⁽²⁴⁷⁾

28. Li-jiang Basin

Zhao Guo-guang, 1965⁽²⁴⁹⁾Zhang Yu-ping, You Yu-zhu, Ji Hong-xiang, and Ding Su-yin, 1978⁽²⁴⁷⁾

a. Location: Li-jiang Na-xi-zu Zi-zhi-xian, Yun-nan Province.

Coordinates: 26°48'N; 100°16'E (Li-jiang city)

b. Stratigraphic Sequence:

Xiang-shan Formation (Late Eocene)

Purplish red coarse sandstone with intercalating greyish white calcareous mudstone (150–200 m).

—Unconformity—

Li-jiang Formation (undetermined age)

c. The list of the mammalian fauna:

Xiang-shan Formation (Late Eocene)

⁹ The locality is uncertain.

- Order Creodonta Cope, 1875
 Creodonta indet.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Hyaenodontidae Leidy, 1869
 Hyaenodontidae indet.⁽²⁴⁷⁾
- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
Honanodon hebetis Chow, 1965⁽²⁴⁷⁾⁽²⁵⁵⁾⁽⁴⁰⁾
Honanodon sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
- Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
 Brontotheriidae gen. et sp. indet.⁽²⁴⁷⁾
 Family Lophialetidae Radinsky, 1965
Breviodon sp. nov.⁽²⁴⁷⁾⁽²⁵⁵⁾
Schlosseria sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Lophiodontidae Gill, 1872
 ?*Lophiodon* sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Deperetellidae Radinsky, 1965
Deperetella sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
Teleolophus sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Hyracodontidae Cope, 1879
Caenolophus sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Arynodontidae Scott and Osborn, 1883
Arynodon sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Rhinocerotidae Owen, 1845
Prohyracodon sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Eomoropidae Viret, 1958
Lunania cf. *youngi* Chow, 1957⁽²³⁾⁽²⁴⁷⁾⁽²⁵⁵⁾
Eomoropus sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
- Order Artiodactyla Owen, 1848
 Family Entelodontidae Lydekker, 1883
Eoentelodon sp. nov.⁽²⁵⁵⁾⁽²⁴⁷⁾
 Family Anthracotheriidae Gill, 1872
Anthracokeryx sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
Anthracothema sp.⁽²⁴⁷⁾⁽²⁵⁵⁾
 Family Hypertragulidae Cope, 1879
 Hypertragulidae gen. et sp. indet.⁽²⁴⁷⁾

Section 3. Oligocene

I. Nei-mong-gol (Inner Mongolia) Region

1. Shara Murun-Irdin Manha Area

- 1A. Early Oligocene: Ulan Gochu Formation and Urtyn Obo Formation
 Osborn, H. F., 1929⁽¹³⁹⁾
 Radinsky, L. B., 1964⁽¹⁵⁷⁾
 Chow Min-chen and A. K. Rozhdestvensky, 1960⁽⁵⁵⁾
 Qi Tao, 1979⁽¹⁴⁷⁾
- a. Location: Ulan Gochu Formation: The fossils which have been published were mainly collected at East Mesa, Twin Oboes, and Jhama Obo, but also a few forms were found at Baron Sog Mesa (Ulan Gochu, now called Ba-yan-obo).
 Coordinates: Around 42°30'N; 111°30'E
 Urtyn Obo Formation: Fossils collected from the locality about 15 miles northeast of the East Mesa.
- b. Stratigraphic Sequence: Red clays; maximum 50 ft.
- c. The list of the mammalian fauna:
 Ulan Gochu Formation and Urtyn Obo Formation (Early Oligocene)

- Order Anagalida Szalay and McKenna, 1971
 Family Anagalidae Simpson, 1931
Anagale gobiensis Simpson, 1931⁽¹⁶²⁾⁽¹¹³⁾
 (Twin Oboes, Jhama Obo)
- Order Lagomorpha Brandt, 1855
 Family Leporidae Gray, 1921
Gobiolagus andrewsi Burke, 1941⁽¹¹⁰⁾
 (Twin Oboes, Jhama Obo)
Gobiolagus(?) major Burke, 1941⁽¹¹⁰⁾
 (Urtyn Obo)
- Family Ochotonidae Thomas, 1897
Procaprolagus vetustus (Burke, 1941)⁽¹¹⁰⁾⁽²⁶⁴⁾ (Twin Oboes, Jhama Obo)
- Order Rodentia Bowdich, 1821
 Family Ischyromyidae Alston, 1876
Hulgana ertnia Dawson, 1968⁽⁶⁹⁾ (Jhama Obo)
- ?Ischyromyidae indet.⁽⁶⁹⁾ (Jhama Obo)
- Family Cylindrodontidae Miller and Gidley, 1918
Ardynomys sp.⁽⁶⁹⁾ (Jhama Obo)
- Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
Mongolestes hadrodens Szalay and Gould, 1966⁽¹⁶⁸⁾ (Twin Oboes, Jhama Obo)
 cf. *Harpagolestes* sp.⁽¹⁶⁸⁾ (Twin Oboes)
- Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
Embolotherium andrewsi Osborn, 1925⁽¹³⁹⁾⁽⁸⁷⁾ (East Mesa)
Embolotherium (?) grangeri Osborn, 1925⁽¹³⁹⁾⁽⁸⁷⁾ (East Mesa)
Embolotherium loucksii Osborn, 1929⁽⁸⁷⁾⁽¹³⁹⁾ (Baron Sog Mesa)
Metatitan primus Granger and Gregory, 1943⁽⁸⁷⁾ (Chimney Butte)
Metatitan progressus Granger and Gregory, 1943⁽⁸⁷⁾ (Jhama Obo)
Parabrontops gobiensis (Osborn, 1925)⁽⁸⁷⁾⁽¹³⁸⁾ (Urtyn Obo)
Titanodectes minor Granger and Gregory, 1943⁽⁸⁷⁾ (Shara Murun)
Titanodectes ingens Granger and Gregory, 1943⁽⁸⁷⁾ (Jhama Obo)
- Family Deperetellidae Radinsky, 1965
Teleolophus magnus Radinsky, 1965⁽¹⁵⁸⁾
 (Urtyn Obo)
- Family Hyracodontidae Cope, 1879
Ardynia praecox Matthew and Granger, 1923⁽¹¹⁶⁾⁽¹⁵⁹⁾ (Urtyn Obo)
- Family Arynodontidae Scott and Osborn, 1883
Cadurcodon ardynensis Osborn, 1923⁽²¹⁵⁾⁽¹³⁴⁾ (Urtyn Obo)
Cadurcodon sp.⁽²¹⁵⁾
- Family Rhinocerotidae Owen, 1845
Urtinotherium incisivum Chow and Chiu, 1964⁽⁴⁶⁾ (Urtyn Obo, Jhama Obo)
- 1B. Middle-Late Oligocene: Houldjin Formation
 Granger, W., and C. P. Berkey, 1922⁽⁸²⁾

- Berkey, C. P., and F. K. Morris, 1927⁽⁴⁾
 Chow Min-chen and A. K. Rozhdestvensky, 1960⁽⁵⁵⁾
 Qi Tao, 1979⁽¹⁴⁷⁾¹⁰
- a. Location: Houldjin Locality is situated about 20 miles south-southeast of Iren Dabasu.
 Coordinates: Around 43°30'N; 112°15'E
- b. Stratigraphic Sequence: "yellow pebbly gravel which forms the top of the escarpment" (15 ft).
- c. The list of the mammalian fauna:
 Houldjin Formation (Middle-Late Oligocene)
 Order Pantodonta Cope, 1873
 Family Coryphodontidae Marsh, 1876
Hypercoryphodon thomsoni Osborn and Granger, 1932⁽¹⁴²⁾ (Houldjin)
 Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
Hyoitan thomsoni Granger and Gregory, 1943⁽⁸⁷⁾ (Camp Margetts)
Metaitan relictus Granger and Gregory, 1943⁽⁸⁷⁾ (Camp Margetts)
Embolotherium ultimum Granger and Gregory, 1943⁽⁸⁷⁾ (Baron Sog)
 Family Deperetellidae Radinsky, 1965
?Deperetella sp.⁽¹⁵⁸⁾ AMNH no. 81807 (Camp Margetts)
?Teleolophus sp.⁽¹⁵⁸⁾ AMNH no. 81852 (Camp Margetts)
 Family Arynodontidae Scott and Osborn, 1883
Cadurcodon sp.⁽¹¹⁵⁾
 Family Rhinocerotidae Owen, 1845
Indricotherium grangeri (Osborn, 1923)⁽¹³²⁾⁽⁸⁴⁾⁽⁸⁵⁾ (Urtyn Obo, Jhama Obo, Camp Margetts, Nom Khong Obo)
Caenopus sp.⁽¹¹⁵⁾ (Houldjin)
 Family Chalicotheriidae Gill, 1872
Schizotherium sp.⁽⁶⁵⁾ (Nom Khong Obo)
 Order Artiodactyla Owen, 1848
 Family Entelodontidae Lydekker, 1883
Entelodon dirus Matthew and Granger, 1923⁽¹¹⁵⁾ (Houldjin)
2. Deng-kou (Saint Jacques) Area
 Teilhard de Chardin, P., 1926⁽¹⁷⁷⁾
 Chow Min-chen and A. K. Rozhdestvensky, 1960⁽⁵⁵⁾
- a. Location: East bank of the Yellow River, opposite to the city of Deng-kou.
 Coordinates: 40°18'N; 107°00'E
- b. The list of the mammalian fauna (Middle Oligocene)¹¹
 Order Insectivora Bowdich, 1821
 Family Erinaceidae Bonaparte, 1838
Amphichinus acridens (Matthew and Granger, 1924)⁽¹⁷⁷⁾⁽¹²⁰⁾
 Order Lagomorpha Brandt, 1855
 Family Leporidae Gray, 1821
Ordolagus teilhardi (Burke, 1941)⁽¹⁷⁷⁾⁽¹⁰⁾⁽¹³¹⁾
 Family Ochotonidae Thomas, 1897
Bohlinotona pusilla (Teilhard de Chardin)⁽¹⁷⁷⁾⁽¹⁶⁷⁾⁽¹³¹⁾
Procaprolagus radcidens (Teilhard de Chardin)⁽¹⁷⁷⁾⁽¹⁶⁷⁾⁽¹³¹⁾
Sinlagomys cf. *major* Bohlin, 1937⁽¹³¹⁾⁽¹⁷⁷⁾⁽⁵⁾
 Order Rodentia Bowdich, 1821
 Family Ctenodactylidae Zittel, 1893
Tataromys deflexus Teilhard de Chardin, 1926⁽¹⁷⁷⁾⁽⁹⁹⁾
Tataromys plicidens Matthew and Granger, 1923⁽¹⁷⁷⁾⁽¹¹⁸⁾
Karakoromys ?decessus Matthew and Granger, 1923⁽¹⁷⁷⁾⁽¹¹⁸⁾
 Family Cylindrodontidae Miller and Gidley, 1918
Tsaganomys altaicus Matthew and Granger, 1923⁽¹⁷⁷⁾⁽¹¹⁷⁾⁽⁹⁹⁾
 Order Creodonta Cope, 1875
 Family Hyaenodontidae Leidy, 1869
?Hyaenodon sp.⁽¹⁷⁷⁾
 Order Perissodactyla Owen, 1848
 Family Rhinocerotidae Owen, 1845
Indricotherium grangeri (Osborn, 1923)⁽¹⁷⁷⁾ (= *Paraceratherium* sp. indet.)⁽¹⁶⁾
Paraceratherium sp. (small form)⁽¹⁷⁷⁾⁽¹⁶⁾
?Aceratherium sp.⁽¹⁷⁷⁾
 Family Chalicotheriidae Gill, 1872
Schizotherium avitum Matthew and Granger, 1923⁽¹⁷⁷⁾⁽¹¹⁶⁾
 Order Artiodactyla Owen, 1848
 Family Cervidae Gray, 1821
Eumeryx sp.⁽¹⁷⁷⁾
3. Hos Burd (Suhaitu) Basin
 Chow Min-chen and A. K. Rozhdestvensky, 1960⁽⁵⁵⁾
 Qi Tao, 1975⁽¹⁴⁶⁾
 Jiang Yuan-ji, Wang Bao-liang, and Qi Tao, 1976⁽⁹⁸⁾
- a. Location: About 120 km NW of Alxa Zuoqi city and 50 km west of Jartai Yanchi (Gi-lan-tai salt lake).
 Coordinates: Around 39°35'N; 104°45'E
- b. Dimensions: length: 80 km (NE-SW); width: 20 km (NW-SE).
- c. Stratigraphic Sequence: Cha-gan-bu-la-ge Formation (Early Oligocene)
 Upper: Brownish red and green sandy mudstone, siltpelites with intercalated sandstones, and gypsum. Main fossil beds [74096-74098]. (Thickness, more than 40 m.)
 Middle: Red sandstones and conglomerates (70 m).

¹⁰ Qi (1979) introduced a new name of the Oligocene in Shara Murun area as Nau-gon-dai Formation. According to Qi's point of view, the Lower Nau-gon-dai Formation is overlying Urtyn Obo Formation, with *Embolotherium andrewsi* and *Urtynotherium incisivum* etc., more than 10 forms of fossils, and represents the Middle Oligocene in age. The Upper Nau-gon-dai Formation correlates with the Houldjin Formation, containing *Indricotherium grangeri* and *Hypercoryphodon thomsoni*, and is of Late Oligocene age.

¹¹ During recent years two large collections of Oligocene mammals from different horizons around the Saint Jacques area were collected by Wang B. Y. and Huang X. S., respectively.

Table 4.—*The list of the mammalian fauna of Hsanda Gol Formation (Middle Oligocene), Mongolia (after J. S. Mellett, 1968⁽¹³⁰⁾, revised).*

Order Insectivora Bowdich, 1821
 Family Erinaceidae Bonaparte, 1838
Amphechinus rectus (Matthew and Granger, 1924)⁽¹³⁰⁾⁽¹²⁰⁾
Amphechinus acridens (Matthew and Granger, 1924)⁽¹³⁰⁾⁽¹²⁰⁾
Tupaionodon morrisoni Matthew and Granger, 1924⁽¹³⁰⁾⁽¹²⁰⁾
?Tupaionodon minutus Matthew and Granger, 1934⁽¹³⁰⁾⁽¹²⁰⁾
Exallerox hsandagolensis McKenna and Holton, 1967⁽¹³⁰⁾⁽¹¹⁴⁾

Order Lagomorpha Brandt, 1855
 Family Ochotonidae Thomas, 1897
Desmatolagus gobiensis Matthew and Granger, 1923⁽¹¹⁸⁾⁽¹³⁰⁾⁽¹⁶⁷⁾
Desmatolagus robustus Matthew and Granger, 1923⁽¹¹⁸⁾⁽¹³⁰⁾⁽¹⁶⁷⁾
?Ochotonolagus argyropuloi Gureev, 1960⁽¹³⁰⁾⁽²⁶⁴⁾⁽¹⁶⁷⁾

Family Leporidae Gray, 1821
Ordolagus teilhardi (Burke, 1941)⁽¹³¹⁾⁽¹⁰⁾⁽¹³⁰⁾
Procaprolagus vetustus (Burke, 1941)⁽²⁶⁴⁾⁽¹⁰⁾⁽¹³⁰⁾
Agispelagus simplex Argyropulo, 1940⁽²⁶⁰⁾⁽¹³⁰⁾⁽¹⁶⁷⁾

Order Rodentia Bowdich, 1821
 Family Ischyromyidae Alston, 1876
Prosciurus lohicolus Matthew and Granger, 1923⁽¹³⁰⁾⁽¹¹⁸⁾⁽⁹⁹⁾
Prosciurus arboraptus Shevyreva, 1971⁽⁹⁹⁾⁽²⁷⁶⁾

Family Cylindrodontidae Miller and Gidley, 1918
Pseudocylindrodon mongolicus Kowalski, 1974⁽⁹⁹⁾
Tsaganomys altaicus Matthew and Granger, 1923⁽¹¹⁷⁾⁽⁹⁹⁾
Cyclomytus lohensis Matthew and Granger, 1923⁽¹¹⁷⁾⁽⁹⁹⁾
Cyclomytus minutus Kowalski, 1974⁽⁹⁹⁾

Family ?Aplodontidae Trouessart, 1897
Selenomys mimicus Matthew and Granger, 1923⁽¹¹⁸⁾⁽⁹⁹⁾

Family Ctenodactylidae Zittel, 1893
Tataromys deflexus Teilhard de Chardin, 1926⁽¹³⁰⁾⁽⁹⁹⁾⁽¹⁷⁷⁾
Tataromys gobiensis Kowalski, 1974⁽⁹⁹⁾
Tataromys plicidens Matthew and Granger, 1923⁽¹¹⁸⁾⁽⁹⁹⁾
Tataromys sigmodon Matthew and Granger, 1923⁽¹¹⁸⁾⁽⁹⁹⁾
Tataromys cf. *grangeri* Bohlin, 1946⁽⁹⁹⁾⁽⁷⁾
Karakoromys decessus Matthew and Granger, 1923⁽¹¹⁸⁾⁽⁹⁹⁾
Karakoromys (?=*Leptotataromys*), cf. *Karakoromys* sp.⁽¹³⁰⁾

Family Zapodidae Coues, 1875
Plesiosminthus tangingoli (Bohlin, 1946)⁽⁹⁹⁾⁽⁷⁾

Family Cricetidae Rochebrune, 1883
Cricetops dormitor Matthew and Granger, 1923⁽¹¹⁸⁾⁽⁹⁹⁾
Cricetops cf. *aeneus* Shevyreva, 1965⁽⁹⁹⁾⁽²⁷⁵⁾
Eucricetodon asiaticus (Matthew and Granger, 1923)⁽¹¹⁸⁾⁽¹¹¹⁾

Family Rhizomyidae Miller and Gidley, 1918
Tachyoryctoides obrutschewi Bohlin, 1937⁽⁹⁹⁾⁽⁵⁾
Tachyoryctoides pachygnathus Bohlin, 1937⁽¹³⁰⁾⁽⁵⁾

Order Creodonta Cope, 1875
 Family Hyaenodontidae Leidy, 1869
Hyaenodon pervagus Matthew and Granger, 1924⁽¹¹⁹⁾
Hyaenodon aymardi Filhol, 1881⁽¹³⁰⁾

Table 4.—*Continued.*

Hyaenodon ambiguus Martin, 1906⁽¹³⁰⁾
Hyaenodon compressus Filhol, 1881⁽¹³⁰⁾

Order Carnivora Bowdich, 1821
 Family Miacidae Cope, 1880
Amphicticeps shackelfordi Matthew and Granger, 1924⁽¹³⁰⁾⁽¹¹⁹⁾

Family Canidae Gray, 1821
?Cynodictis elegans Matthew and Granger, 1924⁽¹³⁰⁾⁽¹¹⁹⁾
?Cynodictis constans (Matthew and Granger, 1924)⁽¹³⁰⁾⁽¹¹⁹⁾
Amphicyonodon teilhardi (Matthew and Granger, 1924)⁽¹³⁰⁾⁽¹¹⁹⁾

Family Mustelidae Swainson, 1835
Palaeogale (=“*Bunaelurus*”) *ulysses* (Matthew and Granger, 1924)⁽¹³⁰⁾⁽¹¹⁹⁾
Palaeogale parvula (Matthew and Granger, 1924)⁽¹³⁰⁾⁽¹¹⁹⁾
Plesictis Pomel, 1846; cf. *Plesictis* sp.⁽¹³⁰⁾

Family Viverridae Gray, 1821
Palaeoprionodon gracilis Matthew and Granger, 1924⁽¹³⁰⁾⁽¹¹⁹⁾

Family Felidae Gray, 1821
Nimravus Cope, 1879; cf. *Nimravus* sp.⁽¹³⁰⁾
Proailurus Filhol, 1879; cf. *Proailurus* sp.⁽¹³⁰⁾

Order Perissodactyla Owen, 1848
 Family Hyracodontidae Cope, 1879
Indricotherium (=“*Baluchitherium*”) *grangeri* (Osborn, 1923)⁽¹³²⁾⁽¹³⁰⁾

Family Rhinocerotidae Owen, 1845
 gen. et sp. indet.⁽¹³⁰⁾

Order Artiodactyla Owen, 1848
 Family Cervidae Gray, 1821
Eumeryx culminis Matthew and Granger, 1924⁽¹²⁰⁾
Miomeryx Matthew and Granger, 1925⁽¹²³⁾; cf. *Miomeryx* sp.⁽¹³⁰⁾

Family Gelocidae Schlosser, 1886
Pseudomeryx gobiensis Trofimov, 1957⁽¹³⁰⁾

Family Bovidae Gray, 1821
Palaeohypsodontus asiaticus Trofimov, 1958⁽¹⁹²⁾

Mammalia, Order indet.
 Family Didymoconidae Kretzoi, 1943
Didymoconus (=“*Tschelkaria*”) *colgatei* Matthew and Granger, 1924⁽¹³⁰⁾⁽¹¹⁹⁾
Didymoconus berkei Matthew and Granger, 1924⁽¹³⁰⁾⁽¹¹⁹⁾

Lower: Greyish white, light red conglomerates with intercalated sandy mudstones (30 m).

d. The list of the mammalian fauna:
 Cha-gan-bu-la-ge Formation (Early Oligocene)
 Order Rodentia Bowdich, 1821
 gen. et sp. indet.⁽¹⁴⁶⁾
 Order Lagomorpha Brandt, 1855
 gen. et sp. indet.⁽¹⁴⁶⁾
 Order Condylarthra Cope, 1881
 Family Mesonychidae Cope, 1875
Harpagolestes alxaensis Qi, 1975⁽¹⁴⁶⁾

Table 5.—The list of the mammalian fauna of Ardyn Obo (=Ergeleen-Dzo) Formation (Early Oligocene), Mongolia (according mainly to N. M. Janovskaja, E. N. Kurotchkin, and E. V. Davjatkin, 1977⁽²⁸¹⁾).

Order Insectivora Bowdich, 1821
 Family Erinaceidae Bonaparte, 1838
?Amphechinus sp.

Family Leptictidae Gill, 1872
?Ictopidium sp.

Family Soricidae Gray, 1821
 gen. et sp. indet.

Order Lagomorpha Brandt, 1855
 Family Ochotonidae Thomas, 1897
Desmatolagus robustus Matthew and Granger, 1923

Order Rodentia Bowdich, 1821
 Family Cylindrodontidae Miller and Gidley, 1918
Ardynomys olseni Matthew and Granger, 1925
Ardynomys vinogradovi Shevyreva, 1972
Morosomys silenti Shevyreva, 1972

Family Cricetidae Rochebrune, 1883
Eucricetodon (Eumys) sp.

Order Creodonta Cope, 1875
 Family Hyaenodontidae Leidy, 1869
Hyaenodon eminus Matthew and Granger, 1925
Pterodon mongoliensis (Dashzeveg, 1964)

Order Carnivora Bowdich, 1821
 Family Canidae Gray, 1821
?Cynodictis sp.

Order Condylarthra Cope, 1881
 Family and genus indet.

Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
Embolotherium andrewsi Osborn, 1929
 (*Epimanteoceras amplius* Janovskaja, 1976)
Epimanteoceras robustus (Granger and Gregory, 1943)
Metatitan relictus Granger and Gregory, 1943
Parabrontops gobiensis (Osborn, 1925)
Protombolotherium efremovi Janovskaja, 1954
Titanodectes ingens Granger and Gregory, 1943

Family Helaletidae Osborn, 1892
Colodon inceptus Matthew and Granger, 1925
Colodon sp.

Family Hyracodontidae Cope, 1879
Ardynia praecox Matthew and Granger, 1923
 gen. indet.

Family Amynodontidae Scott and Osborn, 1883
Amyndon mongoliensis Osborn, 1936
Cadurcodon ardynensis (Osborn, 1924)
Caenolophus promissus Matthew and Granger, 1925
Gigantamynodon cessator Gromova, 1954
Hypsamynodon progressus Gromova, 1954
 gen. indet.

Family Rhinocerotidae Owen, 1845
Symphysorrhachis breviorostris Beliajeva, 1954

Family Chalicotheriidae Gill, 1872
Schizotherium avitum Matthew and Granger, 1925

Table 5.—Continued.

Order Artiodactyla Owen, 1848
 Family Entelodontidae Lydekker, 1883
Ergilobia gobiensis Trofimov, 1952
Archaeotherium sp.

Family Anthracotheriidae Gill, 1872
Brachyodus sp.
 gen. indet.

Family Gelocidae Schlosser, 1886
Lophiomeryx angarae Matthew and Granger, 1925
Lophiomeryx gobiae Matthew and Granger, 1925
Miomeryx altaicus Matthew and Granger, 1925
Miomeryx sp.
Gobiomeryx dubius Trofimov, 1956

Family Cervidae Gray, 1821
Eumeryx sp.

Mammalia, Order indet.
 Family Didymoconidae Kretzoi, 1943
Ardynictis furunculus Matthew and Granger, 1925

Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
Embolotherium grangeri Osborn, 1929⁽¹⁴⁶⁾⁽¹³⁹⁾
 Embolotheriinae indet.⁽¹⁴⁶⁾

Family Amynodontidae Scott and Osborn, 1883
Paracadurcodon suhaituensis Xu, 1966⁽²¹⁵⁾
Amyndon alxaensis Qi, 1975⁽¹⁴⁶⁾
Sianodon spp.⁽²¹⁵⁾
 Amynodontidae indet.⁽¹⁴⁶⁾⁽²¹⁵⁾
 Perissodactyla indet.⁽¹⁴⁶⁾

Order Artiodactyla Owen, 1848
 Family Entelodontidae Lydekker, 1883
 gen. et sp. indet.⁽⁵⁵⁾
 ?Family Cervidae Gray, 1821
 gen. et sp. indet.⁽¹⁴⁶⁾

II. Ning-xia (Ningsia) Region
 4. Ling-wu Basin
 Young Chung-chien and Chow Min-chen, 1956⁽²³³⁾
 Hu Chang-kang, 1962⁽⁹²⁾

a. Location: Qing-shui-ying (Ching-shui-ying), 40 km ENE of the Ling-wu city.
 Coordinates: 38°05'N; 106°20'E (Ling-wu city)

b. The list of the mammalian fauna:
 Qing-shui-ying Formation⁽¹⁴³⁾ (Middle Oligocene)

Order Rodentia Bowdich, 1821
 Family Cylindrodontidae Miller and Gidley, 1918
Cyclomyx lohensis Matthew and Granger, 1923⁽²³³⁾⁽¹¹⁷⁾

Order Perissodactyla Owen, 1848
 Family Rhinocerotidae Owen, 1845
Indricotherium grangeri (Osborn, 1923)⁽²³³⁾⁽¹³²⁾

Family Chalicotheriidae Gill, 1872
Schizotherium sp.⁽⁹⁰⁾

Order Artiodactyla Owen, 1848
 Family Entelodontidae Lydekker, 1883
Archaeotherium ordosius Young and
 Chow, 1956⁽²³³⁾
 Family Cervidae Gray, 1821
 “*Eumeryx*” sp.⁽⁹²⁾⁽¹²⁰⁾

5. Others

Two small Oligocene localities of Tong-xin and Guyuan, yielding *Indricotherium* only, were reported by Hu (1962:170). The fossils of these localities have not yet been published.

III. Xin-jiang (Sinkiang) Region

6. Turpan (Turfan) Basin

Chow Min-chen and Xu yu-xuan, 1959⁽⁶⁰⁾
 Zhai Ren-jie, Zheng Jia-jian, and Tong Yong-sheng, 1978⁽²⁴¹⁾
 Zhai Ren-jie, 1978⁽²³⁹⁾

a. Location: East part of the Turpan Basin, along the railway from Da-bu to Fei-yue.
 Coordinates: Around 43°10'N; 91°35'E
 (Fig. 6)

b. Stratigraphic Sequence:

Tao-shu-yuan-zi Group: Red and brownish yellow sandy clays, sandstones with intercalated dark grey conglomerates [64080–64082] (700 m).

c. The list of the mammalian fauna:

Tao-shu-yuan-zi Group (Oligocene)
 Lower part of the Tao-shu-yuan-zi Group (Early Oligocene)
 Order Perissodactyla Owen, 1848
 Family Amyndontidae Scott and Osborn, 1883
Cadurcodon ardynense (Osborn, 1923)⁽²⁴¹⁾ [66018]

Upper part of the Tao-shu-yuan-zi Group (Middle-Late Oligocene)

Order Insectivora Bowdich, 1821
 Family Erinaceidae Bonaparte, 1838
Amphechinus cf. *rectus* (Matthew and Granger, 1924)⁽²³⁹⁾ [64081-14]
 ?*Amphechinus* sp.⁽²³⁹⁾ [64081]

Order Lagomorpha Brandt, 1855
 Family Ochotonidae Thomas, 1897
Sinolagomys kansuensis Bohlin, 1937⁽²³⁹⁾⁽⁵⁾ [64081-12]

Order Rodentia Bowdich, 1821
 Family Ctenodactylidae Zittel, 1893
Tataromys cf. *sigmodon* Matthew and Granger, 1923⁽²³⁹⁾⁽¹¹⁸⁾ [64081-12]

Order Creodonta Cope, 1875
 Family Hyaenodontidae Leidy, 1869
 ?*Hyaenodon* sp.⁽²³⁹⁾ [64082-4]

Order Perissodactyla Owen, 1848
 Family Rhinocerotidae Owen, 1845
Paraceratherium lipidus Xu and Wang, 1978⁽²²⁰⁾

Paraceratherium tienshanensis Chiu, 1962⁽⁶⁰⁾⁽¹⁶⁾⁽²³⁹⁾

Dzungariotherium turfanensis Xu and Wang, 1978⁽²²⁰⁾

Indricotheriidae indet.⁽²²⁰⁾

?*Aceratherium* sp.⁽²³⁹⁾ [64082-2]

Family Chalicotheriidae Gill, 1872

Schizotherium sp.⁽²³⁹⁾ [64080]

Order Artiodactyla Owen, 1848

Family Anthracotheriidae Gill, 1872

gen. et sp. indet.⁽²³⁹⁾ [64081]

Family Tragulidae Milne Edwards, 1864

?Tragulidae gen. et sp. indet.⁽²³⁹⁾ [64081]

Mammalia, Order indet.

Family Didymoconidae Kretzoi, 1943

Didymoconus berkeyi Matthew and Granger, 1924⁽²³⁹⁾⁽¹¹⁹⁾ [64081]

7. Ha-mi Basin

Some molar teeth of *Parabrontops* sp. collected from Ye-ma-quan, Ha-mi area, were described by Hu Chang-kang in 1961⁽⁹¹⁾. The age of the fossil is most probably Early Oligocene.

8. Jung-gur (Dzungar) Basin

Only two forms of Oligocene mammals were reported from Jung-gur Basin:

1. *Dzungariotherium orgosensis* Chiu, 1973⁽¹⁸⁾ (Rhinocerotidae, Perissodactyla)

Locality: 20 km south of An-ji-hai bridge, and east bank of Huo-er-gou-si (Orgos) River.

Coordinates: Around 44°20'N; 85°25'E

Formation: He-se (Brown) Formation (Middle-Late Oligocene); brown sands and gravels.

2. *Lophiomeryx* sp. (Gelocidae, Artiodactyla), Chiu, 1965⁽¹⁷⁾

Locality: Hong-shan Farm south of Shi-he-zi (Shih-ho-tzu) city.

Coordinates: Around 44°15'N; 86°00'E

Formation: He-se (Brown) Formation (Middle-Late Oligocene).

IV. Gan-su (Kansu) Province

9. Taben buluk Area

Bohlin, B., 1942⁽⁶⁾

Bohlin, B., 1946⁽⁷⁾

a. Location:

“Taben-buluk is a group of springs at the northern foot of Anem-braruin-ola on the great caravan road from Tunhuang to Sirtun . . . The badlands investigated by me extend chiefly towards the east from this place, between it and the debouchment of Tang-ho (Tangin-gol) from Nanshan. The area from which the fossils were obtained does not extend more than 20 kilometers eastwards from Taben-buluk” (Bohlin, 1942:7). There are four large ravines cut through this area, from west to east: Taben buluk, Yindirte, Tieh-chiang-ku, and Hsi-shui. The Yindirte is a most important fossil locality in this area.

Tamu bulak, 60 km SSW of Dunhuang (Tunhuang) city, belongs to the Aksay Kazakzu autonomous county, Gansu Province.

Coordinates: Around 39°30'N; 94°35'E

b. Stratigraphic Sequence:

Taben buluk (Late or Latest Oligocene) (about 1,000 m)

- Upper: Sandstones with intercalated heavy beds of very coarse conglomerates.
 Middle (main part of deposits): Clayey sediments with interbedded conglomerates.
 Lower: Brick red clay and fine sandstones.
- c. The list of the mammalian fauna:
- Order Insectivora Bowdich, 1821
 Family Erinaceidae Bonaparte, 1838
Amphechinus cf. *rectus* (Matthew and Granger, 1924)⁽⁶⁾⁽¹²⁰⁾
Amphechinus kansuensis (Bohlin, 1942)⁽⁶⁾
Amphechinus minimus (Bohlin, 1942)⁽⁶⁾
 ?Erinaceidae indet.⁽⁶⁾
- Family Soricidae Gray, 1821
 Soricidae indet.⁽⁶⁾
- Family Talpidae Gray, 1825
 ?Talpidae indet.⁽⁶⁾
- Order Primates Linnaeus, 1758
 Primate indet. (T. b. 557)⁽⁶⁾
- Order Lagomorpha Brandt, 1855
 Family Ochotonidae Thomas, 1897
Desmatolagus sp. (?*Shargaltensis*)⁽⁶⁾
Sinolagomys kansuensis Bohlin, 1937⁽⁶⁾⁽⁵⁾
Sinolagomys major Bohlin, 1937⁽⁶⁾⁽⁵⁾
- Order Rodentia Bowdich, 1821
 Family Sciuridae Gray, 1821
 “*Sciurus*” sp.⁽⁷⁾
- Family Ctenodactylidae Zittel, 1893
Tataromys grangeri Bohlin, 1946⁽⁷⁾
Tataromys sigmodon Matthew and Granger, 1923⁽⁷⁾⁽¹¹⁸⁾
Tataromys cf. *plicidens* Matthew and Granger, 1923⁽⁷⁾⁽¹¹⁸⁾
Yindirtemys woodi Bohlin, 1946⁽⁷⁾
- Family Cricetidae Rochebrune, 1883
 cf. *Cricetodon* sp.⁽⁷⁾
 aff. *Eumys* sp.⁽⁷⁾
- Family Rhizomyidae Miller and Gidley, 1918
Tachyoryctoides sp.⁽⁷⁾
- Family Zapodidae Coues, 1875
Plesiosminthus asiae centralis (Bohlin, 1946)⁽⁷⁾
Plesiosminthus tangingoli (Bohlin, 1946)⁽⁷⁾
Plesiosminthus parvulus (Bohlin, 1946)⁽⁷⁾
 ?Sicistinae sp. 1 and sp. 2⁽⁷⁾
- Order Carnivora Bowdich, 1821
 gen. et sp. indet. 1 and 2⁽⁷⁾
- Order Perissodactyla Owen, 1848
 Family Rhinocerotidae Owen, 1845
 gen. et sp. indet. (small form)⁽⁷⁾
- Family Chalicotheriidae Gill, 1872
 ?*Schizotherium* sp.⁽⁷⁾
- Order Artiodactyla Owen, 1848
 Family Cervidae Gray, 1821
Eumeryx sp.⁽⁷⁾
 Cervulinae indet.⁽⁷⁾
- Family Bovidae Gray, 1821
 Bovinae indet.⁽⁷⁾
- Mammalia, Order indet.
- Family Didymoconidae Kretzoi, 1943
 ?*Didymoconus* sp.⁽⁷⁾
- There are several forms, such as *Sayimys obliquidens* Bohlin, 1946, *Kansupithecus*, Proboscidea sp., Cervulinae sp., and ?*Aceratherium* sp., collected from the Taben buluk area, for which “we must, however, count with the possibility that the forms derive from Upper Miocene beds” (Bohlin, 1946:250).
10. Shargaltein Gol Area (Late Oligocene)
 Bohlin, B., 1937⁽⁵⁾
 Bohlin, B., 1942⁽⁶⁾
 Bohlin, B., 1946⁽⁷⁾
- a. Location:
 The Shargaltein Gol (Shara River) is the south upper course of Dang-he [Tong-he, also as Dunhuang (Tun-huang) river]. The valley of the river is situated between two mountains (NW-SE direction): the north, Yeh-ma range, and the south Shule nan-shan (Humboldt range). The fossils of Shargaltein Gol are derived from two areas, the Shih-chiang-tzu-ku and Wu-tao-ya-yu, lying about 10 km apart. The Shih-chiang-tzu-ku is located at the north slope of the Humboldt range and near the Ulan davan (Ulan pass). The Wu-tao-ya-yu is 10 km northeast of the Shih-chiang-tzu-ku and situated on the left bank of the Shara River. Bohlin (1953⁽⁹⁾:9, Fig. 1) put the locality of Shih-chiang-tzu-ku on the south bank of the Iqe-he (Yu-ke River), Qing-hai Province, in his figure. That is not correct compared with the description of locality in the text (Bohlin, 1937:7). The localities in the Shargaltein valley lie about 120 km east of Taben buluk.
 Coordinates: Around 39°N; 96°E
- b. The list of the mammalian fauna:
- Order Insectivora Bowdich, 1821
 Family Erinaceidae Bonaparte, 1838
Amphechinus cf. *acridens* (Matthew and Granger, 1924)⁽⁵⁾⁽¹²⁰⁾
 ?*Amphechinus* sp.⁽⁵⁾
 Erinaceidae, small species⁽⁵⁾
- Insectivora indet.⁽⁵⁾
- Order Lagomorpha Brandt, 1855
 Family Ochotonidae Thomas, 1897
Desmatolagus shargaltensis Bohlin, 1937⁽⁵⁾⁽⁶⁾
 ?*Desmatolagus parvidens* Bohlin, 1937⁽⁵⁾⁽⁶⁾
Desmatolagus sp.⁽⁵⁾⁽⁶⁾
Desmatolagus sp., large form⁽⁵⁾⁽⁶⁾
Sinolagomys kansuensis Bohlin, 1937⁽⁵⁾⁽⁶⁾
Sinolagomys major Bohlin, 1937⁽⁵⁾⁽⁶⁾
Sinolagomys gracilis Bohlin, 1942⁽⁵⁾⁽⁶⁾
- Order Rodentia Bowdich, 1821
 Family Sciuridae Gray, 1821
 gen. et sp. indet.⁽⁷⁾
- Family Ctenodactylidae Zittel, 1893
Tataromys cf. *plicidens* Matthew and Granger, 1923⁽⁵⁾⁽¹¹⁸⁾
Karakoromys cf. *decessus* Matthew and Granger, 1923⁽⁵⁾⁽¹¹⁸⁾

Leptotataromys gracilidens Bohlin, 1946⁽⁷⁾

Family Cylindrodontidae Miller and Gidley, 1918

Tsaganomys altaicus Matthew and Granger, 1923⁽⁵⁾⁽¹¹⁷⁾

Family Rhizomyidae Miller and Gidley, 1918

Tachyoryctoides obrutschewi Bohlin, 1937⁽⁵⁾

Tachyoryctoides intermedius Bohlin, 1937⁽⁵⁾

Tachyoryctoides pachygnathus Bohlin, 1937⁽⁵⁾

Family Zapodidae Coues, 1875
Sicistinae indet.⁽⁷⁾

Order Carnivora Bowdich, 1821
gen. et sp. indet.⁽⁷⁾

Order Perissodactyla Owen, 1848

Family Rhinocerotidae Owen, 1845
small rhinocerotid⁽⁷⁾

Indricotherium sp.⁽⁷⁾

Order Artiodactyla Owen, 1848

Family Cervidae Gray, 1821

?*Eumeryx* sp.⁽⁵⁾

Cervulinae sp.⁽⁷⁾

Family Bovidae Gray, 1821
small hypselodont bovine⁽⁷⁾

Mammalia, Order indet.

Family Didymoconidae Kretzoi, 1943
Didymoconus sp.⁽⁷⁾

11. Shih-ehr-ma-cheng Locality (?Oligocene)
Bohlin, B., 1951⁽⁸⁾

a. Location: Shih-ehr-ma-cheng, on the right bank of the Po-yang-ho. Hui-hui-pu, 20 km ENE of Yumen city (Lao-jun-maio oil field city); Gan-su Province.

Coordinates: 39°50'N; 97°44'E (Yumen city)

b. Stratigraphic Sequence: Brick-red sandstone or fine conglomerates laid down in very thick beds.

c. The list of the mammalian fauna:

Order Anagalida Szalay and McKenna, 1971
Family Anagalidae Matthew, Granger, and Simpson, 1929

Anagalopsis kansuensis Bohlin, 1951⁽⁸⁾

Family Mimotonidae Li, 1977

Mimolagus rodens Bohlin, 1951⁽⁸⁾

V. Shaan-xi (Shensi) Province

12. Lan-tian District

Chia Lan-po, Chang Yu-ping, Huang Wan-po, Tang Yin-jun, Chi Hung-siang, You Yü-zhu, Ting Su-yin, and Huang Xue-shi⁽¹⁵⁾

Chang Yu-ping, Huang Wan-po, Tang Yin-jun, Chi Hung-siang, You Yü-zhu, Tong Yung-sheng, Ting Su-yin, Huang Xue-shi, and Cheng Chia-chien, 1978⁽¹¹⁾

Chow Min-chen, 1979⁽⁴²⁾

Six small localities of Early Oligocene age were discovered around the Ba-he River from Xi-an southeast to Lan-tian (coordinates around 34°15'N; 108°55'E). All these localities were referred to the same formation: Bai-lu-yuan For-

mation, mainly white sandstones, about 400 m thick. The fossils can be summarized as follows:

1. Tapiroidea indet.⁽⁴²⁾ (Perissodactyla), Yin-po-cun, Hong-qin-bao, Lin-tong County [65008].

2. *Sianodon bahoensis* Xu, 1965⁽²¹⁾⁽⁴²⁾⁽¹⁷⁾ and *Sianodon* sp.⁽²¹⁷⁾ (Aminodontidae, Perissodactyla), Mao-xi-cun, Xian city [63704].

3. *Sianodon bahoensis* Xu, 1965⁽⁴²⁾ (Aminodontidae, Perissodactyla), Xin-jie, Lantian County [63705].

4. *Lantianius xiehuensis* Chow, 1964⁽³⁹⁾⁽⁸⁰⁾ (?Dichobunidae, Artiodactyla), Kang-wan-gou, Xie-hu, Lantian County [64017].

5. Palaeolaginae indet.⁽¹⁰⁷⁾ (Leporidae, Lagomorpha) and Artiodactyla indet.⁽⁴²⁾, Gao-po, Lantian County [64005].

6. *Aminodon* sp.⁽⁴²⁾ (Aminodontidae, Perissodactyla) and Brontotheriidae indet.⁽⁴²⁾ (Perissodactyla), Gao-wan-gou, Wei-nan County [64017].

VI. Shan-xi (Shansi) Province

13. Yuan-chu Basin

Only a fragmentary lower jaw of *Brachyodus hui* (Chow, 1958) was found from the Early Oligocene of Bai-shui-cun, Yuan-chu County (see also in Section 2-13).

VII. Guang-xi (Kwangsi) Region

14. Bo-se Basin

a. Location, Dimensions, and Stratigraphic Sequence: See the description of the Eocene of Bo-se Basin, Guang-xi Province (Section 2-26).

b. The list of the mammalian fauna:

Gung-kang Formation (Early Oligocene)

Order Carnivora Bowdich, 1821

Family Canidae Gray, 1821

Pachycynodon sp.⁽¹⁷⁶⁾

Order Perissodactyla Owen, 1848

Family Rhinocerotidae Owen, 1845

?*Forstercooperia* sp.⁽¹⁷⁶⁾

Order Artiodactyla Owen, 1848

Family Anthracotheriidae Gill, 1870

Anthracokeryx gungkangensis Qiu, 1977⁽¹⁵⁴⁾ [73079, 74067]

Anthracokeryx kwangsiensis Qiu, 1977⁽¹⁵⁴⁾ [73075]

Anthracokeryx spp.⁽¹⁵⁴⁾ [73089]

Heothema media Tang, 1978⁽¹⁷³⁾ [73088]

Heothema angusticalxia Tang, 1978⁽¹⁷³⁾ [73084]

15. Yong-le Basin

Tang Yin-jun, You Yü-zhu, Xu Qin-qi, Qiu Zhuding, and Hu Yan-kun, 1974⁽¹⁷⁶⁾

a. Location: About 20 km NW of Bo-se city, Bo-se County, Guang-xi Province.

Coordinates: 23°54'N; 106°37'E (Bo-se city)

b. Stratigraphic Sequence:

Gung-kang Formation (Early Oligocene)

Greyish yellow mudstone interbedding with yellowish brown sandstone and a few coarse sandstones [73088, 73091, 74072A] (650 m).

- c. The list of the mammalian fauna:
 Gung-kang Formation (Early Oligocene)
 Order Perissodactyla Owen, 1848
 Family Chalicotheriidae Gill, 1872
Schizotherium nabanensis Zhang, 1976⁽²⁴²⁾
Schizotherium sp.⁽²⁴²⁾
 Family Amynodontidae Scott and Osborn, 1883
Huananodon hypsodonta You, 1977⁽²²⁴⁾
 Family Rhinocerotidae Owen, 1845
Guixia youjiangensis You, 1977⁽²²⁴⁾ [73091]
 Order Artiodactyla Owen, 1848
 Family Anthracotheriidae Gill, 1872
Bothriodon tientongensis Xu, 1977⁽²¹¹⁾ [73088]
Anthracokeryx spp.⁽¹⁵⁴⁾ [73091]
Heothema chengbiensis Tang, 1978⁽¹⁷³⁾ [74072A, 73091]

VIII. Gui-zhou (Kweichow) Province

In 1979 some excellent mammalian fossils, mainly perissodactyls, were collected from the western part (near Shui-cheng—Pan Xian) of Gui-zhou Province. The materials have not been published yet, so it is hard to determine the age of the fauna, which may be Oligocene⁽⁶⁴⁾, or even Eocene.

IX. Yun-nan Province

16. Qu-jing (Chu-ching) Basin

Young Chung-chien and Bien Mei-nien, 1939⁽²³¹⁾
 Chow Min-chen, 1957⁽²¹⁾⁽²³⁾
 Xu Yu-xuan, 1961⁽²¹²⁾
 Zhang Yu-ping, You Yü-zhu, Ji Hong-xiang, and Ding Su-yin, 1978⁽²⁴⁷⁾

- a. Location: Qu-jing County, Yun-nan Province.
 Coordinates: 25°36'N; 103°49'E (Qu-jing city)
 b. Stratigraphic Sequence:
 Cai-jia-chong Formation (Early Oligocene)
 Greyish white and greyish green marls with intercalating thin greyish green mudstone (480 m).
 c. The list of the mammalian fauna:
 Cai-jia-chong Formation (Early Oligocene)
 Order Perissodactyla Owen, 1848
 Family Brontotheriidae Marsh, 1873
 Brontotheriidae gen. et sp. indet.⁽²¹²⁾⁽²⁴⁷⁾⁽¹⁷⁴⁾
 Family Hyracodontidae Cope, 1879
Caenolophus sp.⁽²¹²⁾⁽¹⁷⁴⁾⁽²⁴⁷⁾
 Family Amynodontidae Scott and Osborn, 1883

Cadurcodon ardynensis (Osborn, 1923)⁽²¹²⁾⁽¹⁷⁴⁾

Cadurcodon sp.⁽²¹²⁾⁽²⁴⁷⁾

Gigantamynodon giganteus Xu, 1961⁽²¹²⁾⁽²⁴⁷⁾

Gigantamynodon cf. *giganteus* Xu, 1961⁽¹⁷⁴⁾⁽²⁴⁷⁾

Gigantamynodon sp.⁽¹⁷⁴⁾⁽²⁴⁷⁾

cf. *Metamynodon* sp.⁽¹⁷⁴⁾⁽²¹²⁾⁽²⁴⁷⁾

Family Rhinocerotidae Owen, 1845

Indricotherium qujingensis Tang, 1978⁽¹⁷⁴⁾

Indricotherium sp.⁽²¹²⁾⁽²⁴⁷⁾

Order Artiodactyla Owen, 1848

Family Anthracotheriidae Gill, 1872

Bothriodon chowi Xu, 1961⁽²¹²⁾⁽²⁴⁷⁾

?Anthracotheriidae indet.⁽¹⁷⁴⁾

Family Hypertragulidae Cope, 1879

cf. *Miomeryx* sp.⁽²¹²⁾⁽²⁴⁷⁾

17. Lu-nan Basin

- a. Location, Dimensions, and Stratigraphic Sequence: See the description of the Eocene of Lu-nan Basin (Section 2-27).

- b. The list of the mammalian fauna:

Xiao-tun Formation (Early Oligocene)

Order Perissodactyla Owen, 1848

Family Hyracodontidae Cope, 1879

Hyracodontidae gen. et sp. indet.⁽²⁵⁵⁾

Family Amynodontidae Scott and Osborn, 1883

cf. *Gigantamynodon giganteus* Xu, 1961⁽²¹²⁾⁽²⁵⁵⁾⁽²⁴⁷⁾

Order Artiodactyla Owen, 1848

Family Anthracotheriidae Gill, 1872

Bothriodon sp.⁽²⁷⁾⁽²⁴⁷⁾

Artiodactyla indet.⁽²⁵⁵⁾

18. Luo-ping Basin

Chow Min-chen and Xu Yu-xuan, 1959⁽⁶⁰⁾

Chiu Chan-siang, 1962⁽¹⁶⁾

- a. Location: Luo-ping and Shi-zong counties, Yun-nan Province.

Coordinates: 24°58'N; 104°20'E (Luo-ping city)–24°51'N; 103°59'E (Shi-zong city).

- b. Stratigraphic Sequence: Clay and lignite beds.

- c. The list of the mammalian fauna:

Order Perissodactyla Owen, 1848

Family Rhinocerotidae Owen, 1845

Indricotherium sp.⁽⁶⁰⁾

Indricotherium intermedium Chiu, 1962⁽¹⁶⁾

Indricotheriinae indet.⁽¹⁶⁾

CHAPTER 2.—THE SYSTEMATIC AND STRATIGRAPHIC DISTRIBUTION TABLE
OF THE CHINESE PALEOGENE MAMMALS

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
Multituberculata									
Taeniolabidae									
<i>Prionessus lucifer</i> M. et G.		+	+						1-9, ¹² 2-1
<i>Sphenopsalis nobilis</i> M. G. et S.		+							1-9
Lambdopsalidae									
<i>Lambdopsalis bulla</i> C. et Q.		+							1-9
Multituberculata indet.		+							1-8
Edentata									
Ernanodontidae									
<i>Ernanodon antelios</i> D.		+							1-1
Megalonychoidea									
<i>Chungchienia sichuanica</i> C.					+				2-19
Insectivora									
Deltatheridiidae									
<i>Sarcodon pygmaeus</i> M. et G.		+							1-9
Leptictidae									
<i>Ictopidium lechei</i> Z.					+				2-13
Erinaceidae									
<i>Amphechinus acridens</i> (M. et G.)							+		3-1, 3-2
<i>Amphechinus</i> cf. <i>acridens</i> (M. et G.)								+	3-10
<i>Amphechinus kansuensis</i> (B.)								+	3-10
<i>Amphechinus minimus</i> (B.)								+	3-10
<i>Amphechinus</i> cf. <i>rectus</i> (M. et G.)							+	+	3-6, 3-9
? <i>Amphechinus</i> sp.							+		3-6
?Erinaceidae indet.								+	3-9
Erinaceidae, small species								+	3-10
? <i>Tupaiondon</i> sp.					+				2-8
Soricidae indet.								+	3-9
?Talpidae indet.								+	3-9
Family indet.									
<i>Hyracolestes ermineus</i> M. et G.		+							1-4
Insectivora gen. et sp. indet.		+						+	1-2, 3-10
Insectivora gen. et sp. nov.			+						2-25
Insectivora gen. et sp. nov. [" <i>Sinosinopa sinensis</i> Q."]					+				2-2
? <i>Pantolestes</i> sp.						+			2-3A
Primates									
Adapidae									
<i>Petrolemur brevirostre</i> T.		+							1-1
Anaptomorphidae									
<i>Lushius qinlinensis</i> C.					+				2-17
Omomyidae									
<i>Hoanghoniuss stehlini</i> Z.					+				2-13
Primates indet.								+	3-9
Anagalida									
Anagalidae									
<i>Anagale gobiensis</i> S.							+		3-1
<i>Anagalopsis kansuensis</i> B.							+	?	3-11
<i>Anaptogale wanghoensis</i> X.		+							1-4

¹² The numbers (for example, 1-9) represent, first, that of the Section (or Epoch) and second, that of the basin or area in Chapter 1.

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
<i>Chianshanian jianghuaiensis</i> X.	+								1-4
<i>Diacronus anhuiensis</i> X.	+								1-4
<i>Diacronus wanghuensis</i> X.	+								1-4
<i>Hsiuannania maguensis</i> X.		+							1-5
<i>Hsiuannania minor</i> D. et Z.		+							1-2
<i>Hsiuannania tabiensis</i> X.		+							1-4
<i>Hsiuannania</i> sp.		+							1-4
<i>Huaiyangale chianshanensis</i> X.	+								1-4
cf. <i>Huaiyangale leura</i> D. et T.		+							1-1
<i>Huaiyangale</i> sp.		+							1-4
<i>Linnania lofoensis</i> C. et al.	+								1-1
<i>Stenanagale xiangensis</i> W.	+								1-3
<i>Wanogale hodungensis</i> X.	+								1-4
Pseudictopidae									
<i>Allictops inserrata</i> Q.		+							1-4
<i>Anictops tabiepedis</i> Q.	+								1-4
<i>Anictops</i> aff. <i>tabiepedis</i> Q.	+								1-4
<i>Cartictops canina</i> D. et T.	+								1-4
<i>Haltictops meilingensis</i> D. et T.		+							1-1
<i>Haltictops mirabilis</i> D. et T.		+							1-1
<i>Paranictops majuscula</i> Q.	+								1-4
<i>Paranictops</i> sp.	+								1-4
<i>Pseudictops chaii</i> T.		+							1-8
cf. <i>Pseudictops tenuis</i> D. et Z.		+							1-2
<i>Pseudictops lophiodon</i> M., G. et S.		+	+						1-9, 2-1
Pseudictopidae gen. et sp. indet.		+							1-6
Eurymylidae									
<i>Heomys orientalis</i> L.		+							1-4
<i>Heomys</i> sp.	+								1-4
<i>Hypsimylus beijingensis</i> Z.					+				2-8
<i>Matutinia nitidulus</i> L. et al.			+						2-25
<i>Rhombomylus laianensis</i> Z. et al.			+						2-22
<i>Rhombomylus turpanensis</i> Z.			+						2-5
<i>Rhombomylus</i> sp.			+						2-20
Eurymylidae gen. et sp. indet.		+							1-8
Eurymyloidea indet.		+							1-4
Mimotonidae									
<i>Mimolagus rodens</i> B.						+	?		3-11
<i>Mimotona borealis</i> C. et Q.		+							1-9
<i>Mimotona robusta</i> L.		+							1-4
<i>Mimotona wana</i> L.	+	+							1-4
<i>Mimotona</i> sp.	+								1-4
Zalambdalestidae									
<i>Anchilestes impolitus</i> Q. et L.	+								1-4
Lagomorpha									
Leporidae									
<i>Gobiolagus andrewsi</i> B.						+			3-1
<i>Gobiolagus (?) major</i> B.						+			3-1
<i>Gobiolagus tolmachovi</i> B.					+				2-4
<i>Lushilagus lohoensis</i> L.					+				2-17
<i>Ordolagus teilhardi</i> (B.)							+		3-2
<i>Shamolagus grangeri</i> B.					+				2-3C
<i>Shamolagus medius</i> B.					+				2-4
Palaeolaginae indet.						+			3-12

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
Zapodidae									
<i>Plesiosminthus asiaecentralis</i> (B.)								+	3-9
<i>Plesiosminthus parvulus</i> (B.)								+	3-9
<i>Plesiosminthus tangingoli</i> (B.)								+	3-9
<i>Plesiosminthus</i> sp.					+				2-13
?Sicistinae spp.								+	3-9
Sicistinae indet.								+	3-10
Rhizomyidae									
<i>Tachyoryctoides intermedius</i> B.								+	3-10
<i>Tachyoryctoides obrutschewi</i> B.								+	3-10
<i>Tachyoryctoides pachynathus</i> B.								+	3-10
<i>Tachyoryctoides</i> sp.								+	3-9
?Rodentia indet.		+							1-9
Rodentia indet.				+					2-12
Rodentia indet.							+		3-3
Creodonta									
Hyaenodontidae									
<i>Hyaenodon yuanchuensis</i> Y.					+				2-13
<i>Hyaenodon</i> sp.					+				2-18
? <i>Hyaenodon</i> sp.							+		3-2, 3-6
<i>Propterodon iridinensis</i> M. et G.					+				2-3A, 2-17
<i>Paracynohyaenodon morrisoni</i> M. et G.					+				2-3A
<i>Pterodon dahkoensis</i> C.					+				2-27
<i>Pterodon hyaenoides</i> M. et G.					+				2-4
?“ <i>Sinopa</i> ” sp.					+				2-19
? <i>Thinocyon sichowensis</i> C.				+					2-12
?“ <i>Tritemnodon</i> ” sp.					+				2-19
Hyaenodontidae indet.					+				2-28
Oxyaenidae									
<i>Prolaena parva</i> X. et al.					+				2-19
<i>Sarkastodon mongoliensis</i> G.					+				2-3A
Creodonta indet.					+				2-26, 2-27, 2-28
Carnivora									
Miacidae									
<i>Miacis invictus</i> M. et G.					+				2-3A
<i>Miacis lushiensis</i> C.					+				2-17, 2-19
<i>Miacis</i> sp.					+				2-8
<i>Pappictidops acies</i> W.	+								1-1
<i>Pappictidops obtusus</i> W.	+								1-1
<i>Pappictidops orientalis</i> Q. et L.	+								1-4
<i>Xinyuictis tenuis</i> Z. et al.				+					2-24
Canidae									
<i>Chailicyon crassidens</i> C.					+				2-13, 2-27
<i>Cynodictis</i> sp.					+				2-17
<i>Pachycynodon</i> sp.							+		3-14
Canidae gen. et sp. indet.					+				2-8, 2-27
Felidae									
cf. <i>Eusmilus</i> sp.					+				2-17
? <i>Eusmilus</i> sp.					+				2-26
Felidae indet.					+				2-6, 2-27
Carnivora gen. et sp. indet.				+					2-2
Carnivora gen. et sp. indet.					+				2-18, 2-19
Carnivora gen. et spp. indet.								+	3-9, 3-10
Condylarthra									
Arctocyoniidae									
<i>Paratriisodon gigas</i> C. et al.					+				2-3B, 2-17
<i>Paratriisodon henanensis</i> C.					+				2-17

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
Hyopsodontidae									
<i>Decoredon elongetus</i> X.	+								1-4
? <i>Haplomylus</i> sp.				+					2-12
<i>Hyopsodus</i> sp.			+						2-5
<i>Palasiodon siurenensis</i> C. et al.	+								1-1
<i>Yuodon protoselenoides</i> C. et al.	+								1-1
Hyopsodontidae indet.		+							1-2
Mesonychidae									
<i>Andrewsarchus crassum</i> D. et al.								+	2-26
<i>Andrewsarchus mongoliensis</i> O.								+	2-3A
? <i>Andrewsarchus</i> sp.								+	2-19
<i>Dissacus magushanensis</i> Y. et T.		+							1-5
? <i>Dissacus rotundus</i> W.	+								1-3
? <i>Dissacus</i> sp.		+							1-9
<i>Dissacusium shanghoensis</i> C. et al.	+								1-1
<i>Guilestes acares</i> Z. et C.								+	2-26
<i>Guilestes</i> cf. <i>acares</i> Z. et C.								+	2-26
<i>Hapalodectes serus</i> M. et G.								+	2-3A
? <i>Hapalodectes</i> sp.		+							1-2
<i>Harpagolestes alxaensis</i> Q.								+	3-3
? <i>Harpagolestes orientalis</i> S. et G.								+	2-3C
cf. <i>Harpagolestes</i> sp.								+	2-26, 3-1
<i>Honanodon hebetis</i> C.								+	2-13, 2-28
<i>Honanodon macrodontus</i> C.								+	2-17
<i>Honanodon</i> sp.								+	2-27, 2-28
<i>Hukoutherium ambigum</i> C. et al.	+								1-1
<i>Jiangxia chaotoensis</i> Z. et al.		+							1-2
<i>Lohoodon lushiensis</i> (C.)								+	2-17
<i>Mesonyx</i> sp.								+	2-3A
cf. <i>Mesonyx</i> sp.								+	2-3C
? <i>Mesonyx</i> sp. nov. [" <i>M. obtusidens</i> Q."]				+					2-2
<i>Mongolestes hadrodens</i> S. et G.								+	3-1
<i>Mongolonyx dolichognathus</i> S. et G.								+	2-3B
<i>Mongolonyx</i> sp. nov. [" <i>M. prominentis</i> Q."]				+					2-2
<i>Pachyaena</i> sp.			+		+				2-1, 2-3A
? <i>Pachyaena</i> sp.		+							1-1
<i>Plagiocristodon serratus</i> C. et Q.		+	+						1-9, 2-1
<i>Yantanglestes conexus</i> (Y. et T.)	+								1-4
<i>Yantanglestes datangensis</i> (W.)		+							1-1
<i>Yantanglestes feiganensis</i> (C. et al.)	+								1-1
Mesonychidae gen. et spp. indet.	+	+							1-6, 1-7, 1-8
Mesonychidae gen. et sp. indet.				+					2-19
Periptychidae									
? <i>Ectoconus</i> sp.	+								1-1
<i>Pseudanisonchus antelios</i> Z. et al.		+							1-2
Phenacodontidae									
<i>Eodesmatodon spanios</i> Z. et C.								+	2-26
Notoungulata									
Arctostylopidae									
<i>Allostylops periconotus</i> Z.		+							1-2
<i>Anatolestylops dubius</i> Z.				+					2-5
Arctostylopidae gen. et sp. nov.		+							1-1
<i>Asiostylops spanios</i> Z.		+							1-2
<i>Palaeostylops iturus</i> M. et G.		+	+						1-9, 2-1

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
<i>Palaeostylops macrodon</i> M., G. et S.		+	+						1-9, 2-1
<i>Sinostylops progressus</i> T. et Y.		+							1-5
<i>Sinostylops promissus</i> T. et Y.		+							1-4
Taeniodonta									
Stylinodontidae									
? <i>Stylinodon</i> sp.								+	2-17
Tillodontia									
Esthonychidae									
<i>Lofochaius brachyodus</i> C. et al.	+								1-1
<i>Meiostylodon zaoshiensis</i> W.	+								1-3
<i>Kuanchuanius shantunensis</i> C.				+					2-12
<i>Adapidium huanghoense</i> Y.								+	2-13
Family indet.									
<i>Dysnoetodon minuta</i> Z.	+								1-1
Tillodontia gen. et sp. indet.								+	2-13, 2-27
Tillodontia gen. et sp. nov. [“ <i>Ulanius chowi</i> Q.”]								+	2-2
Pantodonta									
Archaeolambidae									
<i>Archaeolambda dayuensis</i> T.		+							1-2
<i>Archaeolambda</i> cf. <i>planicanina</i> F.		+							1-2, 1-8
<i>Archaeolambda tabiensis</i> H.		+							1-4
<i>Archaeolambda yangtzeensis</i> H.		+							1-5
<i>Archaeolambda</i> sp.		+	+						1-2, 2-25
<i>Nanlingilambda chijiangensis</i> T.			+						1-2
Archaeolambidae indet.	+								1-2
Archaeolambidae gen. et spp. nov.		+							1-1
Archaeolambidae indet.			+						2-14
Bemalambidae									
<i>Bemalambda crassa</i> C. et al.	+								1-1
<i>Bemalambda nanhsiungensis</i> C. et al.	+								1-1, 1-3
<i>Bemalambda pachyoesteus</i> C. et al.	+								1-1
<i>Bemalambda shizikouensis</i> W. et D.	+								1-2
<i>Bemalambda</i> spp.	+								1-1, 1-4
<i>Hypsilolambda chalingensis</i> W.	+								1-3
<i>Hypsilolambda impensa</i> W.	+								1-3
<i>Hypsilolambda</i> spp.	+								1-3
Bemalambidae indet.	+								1-3, 1-4, 1-6, 1-7
Coryphodontidae									
<i>Asiocoryphodon conicus</i> X.			+						2-19
<i>Asiocoryphodon lophodontus</i> X.			+						2-19
<i>Asiocoryphodon</i> sp.			+						2-25
<i>Coryphodon dabuensis</i> Z.			+						2-5
<i>Coryphodon flerowi</i> C.			+	+					2-19, 2-12
<i>Coryphodon ninchiashanensis</i> C. et T.			+						2-24
<i>Coryphodon</i> sp.			+						2-5
<i>Eudinoceras crassum</i> T. et T.								+	2-26
<i>Eudinoceras kholobolchiensis</i> O. et G.								+	2-3C
<i>Eudinoceras mongoliensis</i> O.								+	2-3A
<i>Eudinoceras</i> sp.								+	2-6, 2-8, 2-17
<i>Hypercoryphodon thomsoni</i> O. et G.							+		3-1
<i>Manteodon youngi</i> X.			+						2-21
<i>Manteodon</i> cf. <i>youngi</i> X.			+						2-19
Coryphodontidae gen. et sp. nov. [“ <i>Metacoryphodon luminis</i> Q.”]				+					2-2

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
Coryphodontidae gen. et sp. nov. [" <i>Metacoryphodon minor</i> Q."]				+					2-2
Coryphodontidae gen. et sp. indet.				+					2-19
Harpyodidae									
<i>Harpyodus decorus</i> W.		+							1-2
<i>Harpyodus euros</i> Q. et L.	+								1-4
Pantolambdodontidae									
<i>Dilambda speciosa</i> T.		+							1-8
<i>Pantolambdodon fortis</i> G. et G.						+			2-3C
<i>Pantolambdodon inermis</i> G. et G.						+			2-3C
? <i>Pantolambdodon</i> sp. nov. [" <i>P. minor</i> " Q.]				+					2-2
Pastoralodontidae									
<i>Altilambda pactus</i> C. et W.	+	+							1-1, 1-4
<i>Altilambda tenuis</i> C. et W.	+								1-4
<i>Convallisodon convexus</i> C. et Q.		+							1-9
<i>Convallisodon haliutensis</i> C. et Q.		+							1-9
<i>Pastoralodon lacustris</i> C. et Q.		+							1-9
? <i>Pastoralodon lacustris</i> C. et Q.				+					2-1
Pastoralodontidae indet.		+							1-6
Phenacolophidae									
<i>Ganolphus lanikenensis</i> Z.		+							1-2
<i>Minchenella</i> ("Conolphus") <i>grandis</i> Z.		+							1-1
<i>Tienshanilophus lianmuqinensis</i> T.		+							1-8
<i>Tienshanilophus shengjinkouensis</i> T.		+							1-8
<i>Tienshanilophus subashiensis</i> T.		+							1-8
<i>Yuelophus validus</i> Z.		+							1-1
Phenacolophidae gen. et sp. nov.		+							1-1
Dinocerata									
Uintheriidae									
<i>Ganatherium australis</i> T.			+						2-23
<i>Gobiatherium mirificum</i> O. et G.				+	+				2-2, 2-3B
<i>Gobiatherium</i> sp. nov. [" <i>G. major</i> Q."]				+					2-2
<i>Gobiatherium</i> sp. nov. [" <i>G. monolabotum</i> Q."]				+					2-2
? <i>Gobiatherium</i> sp.			+						2-19
<i>Houyanotherium primigenum</i> T.		+							1-8
<i>Houyanotherium simplum</i> T.		+							1-8
<i>Jiaoluootherium turfanense</i> (C.)		+							1-8
<i>Mongolotherium efremovi</i> F.			+						2-1
<i>Phenaceras lacustris</i> T.			+						2-23
? <i>Probathyopsis sinyuensis</i> C. et T.			+						2-24
<i>Prodinoceras dionicus</i> T.		+							1-8
<i>Pyrodon xinjiangensis</i> Z.			+						2-5
<i>Pyrodon</i> sp.			+						2-1
cf. <i>Uintherium</i> sp.				+					2-12
Prodinoceratinae indet.			+						2-14
Uintheriinae indet.						+			2-17
Perissodactyla									
Brontotheriidae									
<i>Arctotitan honghoensis</i> W.					+				2-7
<i>Desmatotitan tukhumensis</i> G. et G.					+				2-3C
<i>Desmatotitan</i> sp.				+					2-2
<i>Dianotitan lunanensis</i> (C. et H.)					+				2-27
<i>Dolichorhinoides angustidens</i> G. et G.					+				2-3C
<i>Embolotherium andrewsi</i> O.						+			3-1
<i>Embolotherium grangeri</i> O.						+			3-3

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
<i>Embolotherium</i> (?) <i>grangeri</i> O.						+			3-1
<i>Embolotherium loucksii</i> O.						+			3-1
<i>Embolotherium ultimum</i> G. et G.							+		3-1
<i>Epimanteoceras formosus</i> G. et G.					+				2-3C
<i>Gnathotitan berkeyi</i> (O.)					+				2-3A
<i>Hyoititan thomsoni</i> G. et G.							+		3-1
? <i>Lambdaotherium</i> sp.			+						2-1
<i>Metatelmatherium</i> cf. <i>browni</i> C.					+				2-26
<i>Metatelmatherium cristatum</i> G. et G.					+				2-3B
<i>Metatelmatherium parvum</i> G. et G.					+				2-3A
<i>Metatitan primus</i> G. et G.						+			3-1
<i>Metatitan progressus</i> G. et G.						+			3-1
<i>Metatitan relictus</i> G. et G.							+		3-1
<i>Microtitan mongoliensis</i> (O.)					+				2-3A, 2-3C
<i>Microtitan</i> sp. nov. ["?M. <i>elongatus</i> Q."]				+					2-2
? <i>Microtitan</i> sp. (or new genus)					+				2-17
<i>Pachytitan ajax</i> G. et G.					+				2-4
cf. <i>Palaeosyops</i> sp.				+					2-19
<i>Parabrontops gobiensis</i> (O.)						+			3-1
<i>Parabrontops</i> sp.						+			3-7
<i>Protitan bellus</i> G. et G.					+				2-3C
? <i>Protitan cingulatus</i> G. et G.					+				2-3B
<i>Protitan grangeri</i> (O.)					+				2-3A, 2-17
<i>Protitan minor</i> G. et G.					+				2-3B
<i>Protitan obliquidens</i> G. et G.					+				2-3A
<i>Protitan robustus</i> G. et G.					+				2-3A
<i>Protitan</i> cf. <i>robustus</i> G. et G.					+				2-27
? <i>Protitan</i> sp.					+				2-19
cf. <i>Protitan</i> sp.					+				2-26
<i>Rhinotitan andrewsi</i> (O.)					+				2-4
<i>Rhinotitan kaiseni</i> (O.)					+				2-4
<i>Rhinotitan mongoliensis</i> (O.)					+				2-4, 2-13
<i>Rhinotitan quadridens</i> X. et C.					+				2-27
<i>Rhinotitan</i> sp.					+				2-27
? <i>Rhinotitan</i> sp.					+				2-5
<i>Titanodectes ingens</i> G. et G.						+			3-1
<i>Titanodectes minor</i> G. et G.					+	+			2-4, 3-1
Brontotheriidae indet.					+				2-16, 2-27, 2-28
Brontotheriidae indet.						+			3-12, 3-16
Embolotheriinae indet.						+			3-3
Palaeotheriidae									
<i>Propalaeotherium sinensis</i> Z.				+					2-12
Equidae									
<i>Heptaconodon dubium</i> Z.				+					2-12
<i>Propachynolophus hengyangensis</i> (Y.)			+						2-25
Hyracotheriinae indet.				+					2-12
Isectolophidae									
<i>Homogalax wutuensis</i> C. et L.			+						2-10
Lophialetidae									
<i>Breviodon acares</i> R.					+				2-3C
cf. <i>Breviodon acares</i> R.					+				2-3C
<i>Breviodon minutus</i> (M. et G.)					+				2-17
<i>Breviodon</i> cf. <i>minutus</i> (M. et G.)					+				2-19
<i>Breviodon ?minutus</i> (M. et G.)				+	+				2-2, 2-3A
<i>Breviodon sahoensis</i> C. et al.					+				2-27
<i>Breviodon</i> sp. nov.					+				2-28

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
<i>Hyrachyus</i> sp. nov. [“? <i>H. minor</i> Q.”]				+					2-2
<i>Hyrachyus</i> sp. nov. [“ <i>H. neimongoliensis</i> Q.”]				+					2-2
<i>Hyrachyus</i> spp.				+	+				2-12, 2-3B, 2-16
Tapiroidea gen. et sp. nov. [“ <i>Euryletes magnus</i> Q.”]				+					2-2
Tapiroidea gen. et sp. nov. [“ <i>Euryletes medius</i> Q.”]				+					2-2
Tapiroidea gen. et sp. nov. [“ <i>Euryletes minimus</i> Q.”]				+					2-2
Tapiroidea indet.							+		3-12
Hyracodontidae									
<i>Ardynia praecox</i> M. et G.							+		3-1
<i>Caenolophus medius</i> C.								+	2-27
<i>Caenolophus obliquus</i> M. et G.								+	2-4
<i>Caenolophus promissus</i> M. et G.								+	2-4
<i>Caenolophus</i> spp.				+	+		+		2-16, 2-17, 2-26, 2-27, 2-28, 3-16
<i>Imequincisoria mazhuangensis</i> W.								+	2-18
<i>Imequincisoria micracis</i> W.								+	2-18
<i>Imequincisoria</i> (?) sp.								+	2-18
<i>Imequincisoria</i> sp.								+	2-8
<i>Teilhardia pretiosa</i> M. et G.								+	2-3C, 2-27
? <i>Teilhardia</i> sp.								+	2-27
<i>Triplopus? proficiens</i> (M. et G.)								+	2-3A, 2-3C
<i>Triplopus? progressus</i> (M. et G.)								+	2-4
Hyracodontidae gen. et sp. nov.								+	2-18
Hyracodontidae indet.								+	3-17
Amynodontidae									
<i>Amynodon altidens</i> X. et C.								+	2-27
<i>Amynodon alxaensis</i> Q.								+	3-3
<i>Amynodon lunanensis</i> C. et al.								+	2-27
<i>Amynodon mongoliensis</i> O.								+	2-4, 2-5, 2-13, 2-18
<i>Amynodon</i> spp.								+	2-5, 2-13, 2-26, 2-27, 2-28, 3-12
<i>Cadurcodon ardynensis</i> O.								+	3-1, 3-6, 3-16
<i>Cadurcodon</i> sp.								+	3-1, 3-16
<i>Euryodon minimus</i> X. et al.				+					2-19
<i>Gigantamynodon giganteus</i> X.								+	3-16
<i>Gigantamynodon</i> cf. <i>giganteus</i> X.								+	3-16, 3-17
<i>Gigantamynodon promissus</i> X.								+	2-4
<i>Gigantamynodon</i> sp.								+	2-18, 3-16
cf. <i>Gigantamynodon</i> sp.								+	2-26
<i>Huananodon hui</i> Y.								+	2-26
<i>Huananodon hypsodonta</i> Y.								+	3-15
<i>Lushiamynodon menchiapuensis</i> C. et X.								+	2-17, 2-27
<i>Lushiamynodon obesus</i> C. et X.								+	2-15
<i>Lushiamynodon sharamurenensis</i> X.								+	2-4
? <i>Lushiamynodon sharamurenensis</i> X.								+	2-3C
<i>Lushiamynodon wuchengensis</i> W.								+	2-18
cf. <i>Lushiamynodon</i> sp.								+	2-18
cf. <i>Metamynodon</i> sp.								+	2-27, 3-16
<i>Paracadurcodon suhaituensis</i> X.								+	3-3
<i>Paramynodon</i> cf. <i>birmanicus</i> (P. et C.)								+	2-26

CHAPTER 2.—Continued.

Forms	Paleocene		Eocene			Oligocene			Geographical distribution
	E.-M.	L.	E.	M.	L.	E.	M.	L.	
Eomoropidae									
<i>Eomoropus quadridentatus</i> Z.					+				2-13
<i>Eomoropus</i> cf. <i>quadridentatus</i> Z.					+				2-26, 2-27
<i>Eomoropus ulterior</i> C.					+				2-27
<i>Eomoropus</i> sp.					+				2-17, 2-18, 2-28
<i>Grangeria canina</i> Z.				?	+				2-12
<i>Grangeria?</i> <i>major</i> (Z.)					+				2-13, 2-17
<i>Lunania youngi</i> C.					+				2-17, 2-27
<i>Lunania</i> cf. <i>youngi</i> C.					+				2-28
Chalicotheriidae									
<i>Litolophus gobiensis</i> (C.)					+				2-3B
<i>Olsenia mira</i> M. et G.					+				2-4
<i>Schizotherium avitum</i> M. et G.							+		3-2
<i>Schizotherium nabanensis</i> Z.							+		3-15
<i>Schizotherium</i> sp.							+	+	3-1, 3-4, 3-6, 3-15
? <i>Schizotherium</i> sp.								+	3-9
<i>Perissodactyla</i> indet.							+		3-3
Artiodactyla									
Anthracotheeriidae									
<i>Anthracokeryx</i> cf. <i>bambusae</i> P.					+				2-26
<i>Anthracokeryx birmanicus</i> P. et C.					+				2-26
<i>Anthracokeryx</i> cf. <i>birmanicus</i> P. et C.					+				2-26
<i>Anthracokeryx gungkangensis</i> Q.							+		3-14
<i>Anthracokeryx kwangsiensis</i> Q.							+		3-14
<i>Anthracokeryx</i> cf. <i>moriturus</i> P.					+				2-26
<i>Anthracokeryx sinensis</i> (Z.)					+				2-13
<i>Anthracokeryx</i> cf. <i>sinensis</i> (Z.)					+				2-13
<i>Anthracokeryx</i> sp.					+				2-26, 2-28
<i>Anthracokeryx</i> spp.							+		3-14, 3-15
<i>Anthracosenex ambiguus</i> Z.					+				2-13
<i>Anthracothea minima</i> X.					+				2-13
<i>Anthracothea rubricae</i> P.					+				2-26
<i>Anthracothea</i> sp.					+				2-28
<i>Anthracotheium</i> spp.					+				2-17
<i>Bothriodon chowi</i> X.							+		3-16
<i>Bothriodon chyelingensis</i> X.					+				2-26
<i>Bothriodon tientongensis</i> X.							+		3-15
<i>Bothriodon</i> sp.					+	+			2-5, 2-6, 3-17
<i>Brachyodus hui</i> (C.)					+	+			2-27, 3-13
<i>Heothema angusticalxia</i> T.							+		3-14
<i>Heothema bellia</i> T.					+				2-26
<i>Heothema chengbiensis</i> T.							+		3-15
<i>Heothema media</i> T.							+		3-14
<i>Heothema</i> sp.					+				2-26
<i>Huananothema imparilica</i> T.					+				2-26
<i>Probrachyodus panchiaoensis</i> X. et C.					+				2-27
? <i>Probrachyodus</i> sp. nov.					+				2-26
<i>Ulausuodon parvus</i> H.					+				2-4
Anthracotheeriidae indet.					+	+	+		2-15, 2-26, 2-27, 3-1, 3-6
?Anthracotheeriidae indet.							+		3-16
Dichobunidae									
<i>Dichobune</i> spp.					+				2-13, 2-17
<i>Lantianius xiehuensis</i> C.							+		3-12
Choeropotamidae									
<i>Gobiohyus orientalis</i> M. et G.					+				2-3A, 2-17

CHAPTER 3.—THE INDEX

Systematic Index

Form	Distribution	Page	Form	Distribution	Page
<i>Aceratherium</i>			<i>Anagale</i>		
?sp.	3-2, ¹³ 3-6, 3-9	45, 48, 49	<i>gobiensis</i> S.	3-1	44
<i>achaenodont</i>			<i>Anagalopsis</i>		
indet.	2-3A	25	<i>kansuensis</i> B.	3-11	50
<i>Adapidium</i>			<i>Anaptogale</i>		
<i>huanghoense</i> Y.	2-13	32	<i>wanghoensis</i> X.	1-4	19
<i>Advenimus</i>			<i>Anatolestylops</i>		
<i>bohlini</i> D.	2-3C	27	<i>dubius</i> Z.	2-5	29
<i>burkei</i> D.	2-3B	25	<i>Anchilestes</i>		
<i>hupeiensis</i> D. et al.	2-20	37	<i>impolitus</i> Q. et L.	1-4	19
cf. sp.	2-3C	27	<i>Andrewsarchus</i>		
<i>Agispelagus</i>			<i>crassum</i> D. et al.	2-26	41
<i>simplex</i> A.	HG	46	<i>mongoliensis</i> O.	2-3A	24
<i>Allictops</i>			?sp.	2-19	37
<i>inserrata</i> Q.	1-4	17	<i>Anictops</i>		
<i>Allostylops</i>			<i>tabiepedis</i> Q.	1-4	19
<i>periconotus</i> Z.	1-2	16	aff. <i>tabiepedis</i> Q.	1-4	19
<i>Altanius</i>			<i>Anthracokeryx</i>		
<i>orlovi</i> D. et M.	NB	22	cf. <i>bambusae</i> P.	2-26	41
<i>Altilambda</i>			<i>birmanicus</i> P. et C.	2-26	41
<i>pactus</i> C. et W.	1-1, 1-4	13, 19	cf. <i>birmanicus</i> P. et C.	2-26	41
<i>tenuis</i> C. et W.	1-4	19	<i>gungkangensis</i> Q.	3-14	50
<i>Amphechinus</i>			<i>kwangsiensis</i> Q.	3-14	50
<i>acridens</i> (M. et G.)	HG, 3-2	46, 45	<i>sinensis</i> (Z.)	2-13	32, 33
cf. <i>acridens</i> (M. et G.)	3-10	49	cf. <i>sinensis</i> (Z.)	2-13	32
<i>kansuensis</i> (B.)	3-9	49	sp.	2-26, 2-28	41, 44
<i>minimus</i> (B.)	3-9	49	spp.	3-14, 3-15	50, 51
<i>rectus</i> (M. et G.)	HG	46	<i>Anthracosenex</i>		
cf. <i>rectus</i> (M. et G.)	3-6, 3-9	48, 49	<i>ambiguus</i> Z.	2-13	33
?sp.	AO, 3-6, 3-10	47, 48, 49	<i>Anthracothema</i>		
<i>Amphicticeps</i>			<i>minima</i> X.	2-13	33
<i>shackelfordi</i> M. et G.	HG	46	<i>rubricae</i> P.	2-26	41
<i>Amphicynodon</i>			sp.	2-28	44
<i>teihardi</i> (M. et G.)	HG	46	<i>Anthracotherium</i>		
<i>Amynodon</i>			spp.	2-17	34
<i>altidens</i> X. et C.	2-27	43	<i>Anthracotheriidae</i>		
<i>alxaensis</i> Q.	3-3	47	gen. et sp. indet.	2-16, 2-27, AO, 3-6	33, 43, 47, 48
<i>lunanensis</i> C. et al.	2-27	43	?indet.	3-16	51
<i>mongoliensis</i> O.	2-4, 2-5, 2-13, 2-18, AO	28, 33, 35, 47	<i>Archaeolambda</i>		
? <i>mongoliensis</i> O.	2-13	32	<i>dayuensis</i> T.	1-2	16
spp.	2-5, 2-13, 2-26, 2-27, 2-28, 3-12	28, 32, 41, 43, 44, 50	<i>planicanina</i> F.	NB	22
			cf. <i>planicanina</i> F.	1-2, 1-8	16, 21
			<i>tabiensis</i> H.	1-4	17
			<i>yangtzeensis</i> H.	1-5	20
			sp.	1-2, 2-25	16, 40
<i>Amynodontidae</i>			<i>Archaeolambdidae</i>		
indet.	2-4, 2-16, 2-18, 2-26, 3-3	28, 33, 35, 41, 47	gen. et spp. nov.	1-1	13
			gen. et sp. indet.	1-2, 2-14	17, 33

¹³ The numbers (for example, 3-2) represent, first, that of the Section (or Epoch) and second, that of the basin or area in Chapter 1. Abbreviations mean: GA: Gashato; NB: Naran Bulak; HG: Hsanda Gol; AO: Ardyn Obo.

Systematic Index—Continued.

Form	Distribution	Page
<i>Archaeomeryx</i>		
<i>optatus</i> M. et G.	2-4, 2-17	28, 34
sp.	2-3A, 2-16	25, 33
<i>Archaeoryctes</i>		
<i>notialis</i> Z.	1-2	16
<i>Archaeotherium</i>		
<i>ordosius</i> Y. et C.	3-4	48
sp.	AO	47
Arctostylopidae		
gen. et sp. nov.	1-1	13
<i>Arctotitan</i>		
<i>honghoensis</i> W.	2-7	30
<i>Ardynia</i>		
<i>praecox</i> M. et G.	3-1, AO	44, 47
<i>Ardynictis</i>		
<i>furuncululus</i> M. et G.	AO	47
<i>Ardynomys</i>		
<i>olseni</i> M. et G.	AO	47
<i>vinogradovi</i> S.	AO	47
sp.	3-1	44
Artiodactyla		
indet.	3-12, 3-17	50, 51
artiodactylid		
indet. (=“ <i>Hoanghoni</i> <i>stehlini</i> ,” no. 2 of W. et C.)	2-13	32
<i>Asiocoryphodon</i>		
<i>conicus</i> X.	2-19	37
<i>lophodontus</i> X.	2-19	37
sp.	2-25	38
<i>Asiostylops</i>		
<i>spanios</i> Z.	1-2	16
<i>Bemalambda</i>		
<i>crassa</i> C. et al.	1-1	14
<i>nanhsiungensis</i> C. et al.	1-1, 1-3	14, 17
<i>pachyoestus</i> C. et al.	1-1	14
<i>shizikouensis</i> W. et D.	1-2	17
sp.	1-1, 1-4	14, 20
Bemalambdidae		
indet.	1-3, 1-4, 1-6, 1-7	17, 20
<i>Bohlinotona</i>		
<i>pusilla</i> (T.)	3-2	45
<i>Bothriodon</i>		
<i>chowi</i> X.	3-16	51
<i>chuelingensis</i> X.	2-26	41
<i>tientongensis</i> X.	3-15	51
sp.	2-5, 2-6, 3-17	29, 30, 51
Bovinae		
indet.	3-9	49

Systematic Index—Continued.

Form	Distribution	Page
<i>Brachyodus</i>		
<i>hui</i> (C.)	2-13, 2-27,	31, 43,
	3-13	50
sp.	AO	47
<i>Breviodon</i>		
<i>acares</i> R.	2-3C	27
cf. <i>acares</i> R.	2-3C	27
<i>minutus</i> (M. et G.)	2-17	34
cf. <i>minutus</i> (M. et G.)	2-19	37
? <i>minutus</i> (M. et G.)	2-2, 2-3A	24, 25
<i>sahoensis</i> C. et al.	2-27	43
sp. nov.	2-17, 2-28	34, 44
sp.	2-3B, 2-7,	26, 30,
	2-27	42
?sp.	2-3C, 2-18	27, 35
Brontotheriidae		
gen. et sp. indet.	2-16, 2-27,	33, 43,
	2-28, 3-12,	44, 50,
	3-16	51
<i>Cadurcodon</i>		
<i>ardynense</i> (O.)	3-1, AO,	44, 47,
	3-6, 3-16	48, 51
sp.	3-1, 3-16	44, 45, 51
<i>Caenolophus</i>		
<i>medius</i> C.	2-27	43
<i>obliquus</i> M. et G.	2-4	28
<i>promissus</i> M. et G.	2-4, AO	28, 47
sp.	2-16, 2-17,	33, 34,
	2-26, 2-27,	41, 43
	2-28, 3-16	44, 51
<i>Caenopus</i>		
sp.	3-1	45
Canidae		
gen. et sp. indet.	2-8, 2-27	30, 43
Carnivora		
gen. et sp. indet.	2-2, 2-18, 2-19,	23, 35,
	3-9, 3-10	37, 49, 50
<i>Cartictops</i>		
<i>canina</i> D. et T.	1-4	19
Cervidae		
gen. et sp. indet.	3-3	47
Cervulinae		
sp.	3-9, 3-10	49, 50
indet.	3-9	49
<i>Chailicyon</i>		
<i>crassidens</i> C.	2-13, 2-27	32, 43
<i>Chianshania</i>		
<i>gianghuaiensis</i> X.	1-4	19
Choeropotamidae		
indet.	2-26	41

Systematic Index—Continued.

Form	Distribution	Page
<i>Chungchienia</i>		
<i>sichuanica</i> C.	2-19	36
<i>Cocomys</i>		
<i>lingchaensis</i> (L. et al.)	2-25	38
Cocomyidae		
indet. ("Sciuravus sp.")	2-19	36
<i>Colodon</i>		
<i>inceptus</i> M. et G.	AO	47
cf. <i>inceptus</i> M. et G.	2-2	23
?sp.	2-17, 2-19,	34, 37, 47
	AO	
<i>Convallisodon</i>		
<i>convexus</i> C. et Q.	1-9	22
<i>haliutensis</i> C. et Q.	1-9	22
<i>Coryphodon</i>		
<i>dabuensis</i> Z.	2-5	29
<i>flerowi</i> C.	2-12, 2-19	31, 37
<i>ninchiashanensis</i> C. et T.	2-24	38
sp.	2-5	29
Coryphodontidae		
gen. et sp. nov. [" <i>Metacoryphodon minor</i> Q."]	2-2	23
gen. et sp. nov. [" <i>Metacoryphodon luminis</i> Q."]	2-2	23
gen. et sp. indet.	2-19	37
Creodonta		
indet.	2-26, 2-27,	41, 42, 44
	2-28	
<i>Cricetodon</i>		
<i>schaubi</i> Z.	2-13	31
cf. sp.	3-9	49
<i>Cricetops</i>		
cf. <i>aeneus</i> S.	HG	46
<i>dormitor</i> M. et G.	HG	46
<i>Cyclomyxus</i>		
<i>lohensis</i> M. et G.	HG, 3-4	46, 47
<i>minutus</i> K.	HG	46
<i>Cynodictis</i>		
? <i>constans</i> (M. et G.)	HG	46
? <i>elegans</i> M. et G.	HG	46
?sp.	2-17, AO	34, 47
<i>Decoredon</i>		
<i>elongetus</i> X.	1-4	19
<i>Deperetella</i>		
<i>cristata</i> M. et G.	2-4	28
<i>depereti</i> (Z.)	2-13	33
<i>dienensis</i> C. et al.	2-27	43
<i>similis</i> (Z.)	2-13	33
cf. <i>similis</i> (Z.)	2-26, 2-27	41, 43
sp. nov.	2-18	35
sp.	2-3C, 2-7, 2-17,	30, 34, 41, 43, 44, 45
	2-18, 2-26,	36, 41, 43, 44, 45
	2-27, 2-28	

Systematic Index—Continued.

Form	Distribution	Page
<i>Desmatolagus</i>		
<i>gobiensis</i> M. et G.	HG	46
? <i>parvidens</i> B.	3-10	49
<i>robustus</i> M. et G.	HG, AO	46, 47
<i>shargaltensis</i> B.	3-10	49
spp.	3-10	49
sp. (? <i>shargaltensis</i>)	3-9	49
<i>Desmatotitan</i>		
<i>tukhunensis</i> G. et G.	2-3C	27
sp.	2-2	24
<i>Diacronus</i>		
<i>anhuiensis</i> X.	1-4	19
<i>wanghuensis</i> X.	1-4	19
<i>Dianotitan</i>		
<i>lunanensis</i> (C. et H.)	2-27	43
<i>Dichobune</i>		
spp.	2-13, 2-17	33, 34
<i>Didymoconus</i>		
<i>berkeyi</i> M. et G.	HG, 3-6	46, 48
(="Tschelkaria") <i>colgatei</i> M. et G.	HG	46
?sp.	3-9, 3-10	49, 50
<i>Dilambda</i>		
<i>speciosa</i> T.	1-8	21
<i>Diplophodon</i> (<i>Deperetella</i>)		
cf. <i>similis</i> Z.	2-26, 2-27	41, 43
<i>Dissacus</i>		
<i>magushanensis</i> Y. et T.	1-5	20
? <i>rotundus</i> W.	1-3	17
?sp.	1-9, GA	21, 22
<i>Dissacusium</i>		
<i>shanghoensis</i> C. et al.	1-1	13
<i>Dolichorhinoides</i>		
<i>angustidens</i> G. et G.	2-3C	27
<i>Dysnoetodon</i>		
<i>minuta</i> Z.	1-1	14
<i>Dzungariotherium</i>		
<i>orgosensis</i> C.	3-8	48
<i>turfanensis</i> X. et W.	3-6	48
<i>Ectoconus</i>		
?sp.	1-1	14
<i>Embolotherium</i>		
<i>andrewsi</i> O.	3-1, AO	44, 47
<i>grangeri</i> O.	3-3	47
? <i>grangeri</i> O.	3-1	44
<i>loucksii</i> O.	3-1	44
<i>ultimum</i> G. et G.	3-1	45
Embolotheriinae		
indet.	3-3	47
<i>Entelodon</i>		
<i>dirus</i> M. et G.	3-1	45

Systematic Index—Continued.

Form	Distribution	Page
<i>Entelodontidae</i>		
indet.	2-26, 3-3	41, 47
<i>Eodesmatodon</i>		
<i>spanios</i> Z. et C.	2-26	41
<i>Eoentelodon</i>		
<i>yunnanense</i> C.	2-27	43
sp.	2-28	44
<i>Eomoropus</i>		
<i>major</i> Z.	2-17	34
<i>quadridentatus</i> Z.	2-13	33
cf. <i>quadridentatus</i> Z.	2-26, 2-27	41, 43
<i>ulterior</i> C.	2-27	43
sp.	2-17, 2-18, 2-28	34, 36, 44
<i>Epimanteoceras</i>		
<i>amplus</i> J.	AO	47
<i>formosus</i> G. et G.	2-3C	27
<i>robustus</i> (M. et G.)	AO	47
<i>Ergilobia</i>		
<i>gobiensis</i> T.	AO	47
<i>Erinaceidae</i>		
small species	3-10	49
?indet.	3-9	49
<i>Ernanodon</i>		
<i>antelios</i> D.	1-1	13
<i>Eucricetodon</i>		
<i>asiaticus</i> (M. et G.)	HG	46
sp.	AO	47
<i>Eudinoceras</i>		
<i>crassum</i> T. et T.	2-26	41
<i>kholobolchiensis</i> O. et G.	2-3C	27
cf. <i>kholobolchiensis</i> O. et G.	2-21	37
<i>mongoliensis</i> O.	2-3A	24
sp.	2-6, 2-8, 2-17	30, 34
<i>Eumeryx</i>		
<i>culminis</i> M. et G.	HG	46
sp.	AO, 3-2, 3-4, 3-9, 3-10	47, 45, 48, 49, 50
<i>Eumys</i>		
aff. sp.	3-9	49
?Eurymylidae		
gen. et sp. indet.	1-8	21
<i>Eurymyloidea</i>		
indet.	1-4	17
<i>Eurymylus</i>		
<i>laticeps</i>	GA, NB	22
<i>Euryodon</i>		
<i>minimus</i> X. et al.	2-19	37
<i>Eusmilus</i>		
cf. sp.	2-17	34
?sp.	2-26	41

Systematic Index—Continued.

Form	Distribution	Page
<i>Exallerix</i>		
<i>hsandagolensis</i> M. et H.	HG	46
<i>Felidae</i>		
indet.	2-6, 2-27	30, 42
<i>Forstercooperia</i>		
<i>confluens</i> (W.)	2-3B	26
<i>shiwopuensis</i> C. et al.	2-27	43
<i>totadentata</i> (W.)	2-3A	25
sp. nov. [" <i>F. elongata</i> "]	2-2	24
sp. nov. [" <i>F. grandis</i> "]	2-2	24
sp. nov.	2-18	36
spp.	2-3C, 2-17, 2-26, 2-27	27, 34, 41, 43
?sp.	3-14	50
<i>Forstercooperiinae</i>		
indet.	2-18	35
<i>Ganatherium</i>		
<i>australis</i> T.	2-23	38
<i>Ganolophus</i>		
<i>lanikenensis</i> Z.	1-2	16
<i>Gigantamynodon</i>		
<i>cessator</i> G.	AO	47
<i>giganteus</i> X.	3-16	51
cf. <i>giganteus</i> X.	3-16, 3-17	51
<i>promisus</i> X.	2-4	28
spp.	2-18, 2-26, 3-16	35, 41, 51
<i>Gnathotitan</i>		
<i>berkeyi</i> (O.)	2-3A	25
<i>Gobitherium</i>		
<i>mirificum</i> O. et G.	2-2, 2-3B	23, 25
sp. nov. [" <i>G. major</i> Q."]	2-2	23
sp. nov. [" <i>G. monolabotum</i> Q."]	2-2	23
?sp.	2-19	37
<i>Gobiohyus</i>		
<i>orientalis</i> M. et G.	2-3A, 2-17	25, 34
<i>pressidens</i> M. et G.	2-3A	25
<i>robustus</i> M. et G.	2-3A, 2-17	25, 34
<i>yuanchuensis</i> Y.	2-13	33
sp.	2-27	43
<i>Gobiolagus</i>		
<i>andrewsi</i> B.	3-1	44
? <i>major</i> B.	3-1	44
<i>tolmachovi</i> B.	2-4	28
<i>Gobiomeryx</i>		
<i>dubius</i> T.	AO	47
<i>Gomphos</i>		
<i>elkena</i> S.	GA	22
<i>Grangeria</i>		
<i>canina</i> Z.	2-12	31
? <i>major</i> (Z.)	2-13	33

Systematic Index—Continued.

Form	Distribution	Page
<i>Guilestes</i>		
<i>acares</i> Z. et C.	2-26	41
cf. <i>acares</i> Z. et C.	2-26	41
<i>Guixia</i>		
<i>simplex</i> Y.	2-26	41
<i>youjiangensis</i> Y.	3-15	51
<i>Haltictops</i>		
<i>meilingensis</i> D. et T.	1-1	13
<i>mirabilis</i> D. et T.	1-1	13
<i>Hapalodectes</i>		
<i>serus</i> M. et G.	2-3A	24
?sp.	1-2	16
<i>Haplomylus</i>		
?sp.	2-12	31
<i>Harpagolestes</i>		
<i>alxaensis</i> Q.	3-3	46
? <i>orientalis</i> S. et G.	2-3C	27
cf. sp.	2-26, 3-1	41, 44
<i>Harpyodus</i>		
<i>decorus</i> W.	1-2	16
<i>euros</i> Q. et L.	1-4	19
<i>Helaletes</i>		
<i>fissus</i> (M. et G.)	2-3B	26
? <i>fissus</i> (M. et G.)	2-3B	26
<i>mongoliensis</i> (O.)	2-3A, 2-27	25, 43
sp.	2-3B	26
<i>Heomys</i>		
<i>orientalis</i> L.	1-4	17
sp.	1-4	19
<i>Heothema</i>		
<i>angusticalxia</i> T.	3-14	50
<i>bellia</i> T.	2-26	41
<i>chengbiensis</i> T.	3-15	51
<i>media</i> T.	3-14	50
sp.	2-26	41
<i>Heptaconodon</i>		
<i>dubium</i> Z.	2-12	31
<i>Heptodon</i>		
<i>niushanensis</i> C. et L.	2-11	31
<i>tianshanensis</i> Z.	2-5	29
cf. sp.	2-19	37
?sp.	2-1, 2-24	22, 38
<i>Hoanghoni</i>		
<i>stehlini</i> Z.	2-13	31, 32
<i>Homogalax</i>		
<i>wutuensis</i> C. et L.	2-10	30
<i>Honanodon</i>		
<i>hebetis</i> C.	2-13, 2-28	32, 44
<i>macrodonus</i> C.	2-17	34
sp.	2-27, 2-28	42, 44

Systematic Index—Continued.

Form	Distribution	Page
<i>Houyanotherium</i>		
<i>prinigenum</i> T.	1-8	21
<i>simplum</i> T.	1-8	21
<i>Hsiuannania</i>		
<i>maguensis</i> X.	1-5	20
<i>minor</i> D. et Z.	1-2	16
<i>tabiensis</i> X.	1-4	17
sp.	1-4	17
<i>Huaiyangale</i>		
<i>chianshanensis</i> X.	1-4	19
cf. <i>leura</i> D. et T.	1-1	13
sp.	1-4	19
<i>Huananodon</i>		
<i>hui</i> Y.	2-26	41
<i>hypsodonta</i> Y.	3-15	51
<i>Huananothema</i>		
<i>imparilica</i> T.	2-26	41
<i>Hukoutherium</i>		
<i>ambiguum</i> C. et al.	1-1	13
<i>Hulgana</i>		
<i>ertnia</i> D.	3-1	44
<i>Hunanictis</i>		
<i>inexpectatus</i> L. et al.	2-25	40
<i>Hyaenodon</i>		
<i>ambiguus</i> M.	HG	46
<i>aymardi</i> F.	HG	46
<i>compressus</i> F.	HG	46
<i>eminus</i> M. et G.	AO	47
<i>pervagus</i> M. et G.	HG	46
<i>yuanchuensis</i> Y.	2-13	32
sp.	2-18	35
?sp.	3-2, 3-6	45, 48
<i>Hyaenodontidae</i>		
indet.	2-28	44
<i>Hyopsodus</i>		
sp.	2-5	29
<i>Hyopsodontidae</i>		
indet.	1-2	16
<i>Hytitan</i>		
<i>thomsoni</i> G. et G.	3-1	45
<i>Hypercoryphodon</i>		
<i>thomsoni</i> O. et G.	3-1	45
<i>Hypertragulidae</i>		
gen. et sp. indet.	2-28	44
<i>Hypsamynodon</i>		
<i>progressus</i> G.	AO	47
hypsodont bovine (small)	3-10	50
<i>Hypsilambda</i>		
<i>chalingensis</i> W.	1-3	17
<i>impensa</i> W.	1-3	17
spp.	1-3	17

Systematic Index—Continued.

Form	Distribution	Page
<i>Hypsimylus</i>		
<i>beijingsensis</i> Z.	2-8	30
<i>Hyrachyus</i>		
sp. nov. [" <i>H. crista</i> "]	2-2	23
sp. nov. [" <i>H. medius</i> Q."]	2-2	23
sp. nov. [" <i>H. minor</i> Q."]	2-2	23
sp. nov. [" <i>H. neimongol-</i> <i>iensis</i> Q."]	2-2	23
spp.	2-3B, 2-12 2-16	26, 31, 33
Hyracodontidae		
gen. et sp. indet.	AO, 3-17	47, 51
gen. et sp. nov.	2-18	35
<i>Hyracolestes</i>		
<i>ermineus</i> M. et G.	1-4, GA	17, 22
Hyracotheriinae		
gen. et sp. indet.	2-12	31
<i>Ictopidium</i>		
<i>lechei</i> Z.	2-13	31
?sp.	AO	47
<i>Ilianodon</i>		
<i>lunanensis</i> C. et X.	2-27	43
?sp.	2-26	41
<i>Imequincisoria</i>		
<i>mazhuangensis</i> W.	2-18	35
<i>micracis</i> W.	2-18	35
sp.	2-8	30
?sp.	2-18	35
<i>Indomeryx</i>		
<i>cotteri</i> P.	2-26	41
<i>youjiangensis</i> Q.	2-26	41
sp.	2-26	41
<i>Indricotherium</i>		
<i>grangeri</i> O.	3-1, HG, 3-2, 3-4	45, 46, 47
<i>intermedium</i> C.	3-18	51
<i>parvum</i> C.	2-27	43
cf. <i>parvum</i> C.	2-27	43
<i>qujingensis</i> T.	3-16	51
sp.	3-5, 3-10, 3-16, 3-18	48, 50, 51
?sp.	2-27	43
Indricotheriidae		
indet.	3-6, 3-18	48, 51
Insectivora		
gen. et sp. nov.	2-2	23
gen. et sp. indet.	1-2, 2-25, 3-10	16, 38, 49
Ischyromyidae		
?indet.	2-13, 3-1	31, 44
<i>Jiangxia</i>		
<i>chaotoensis</i> Z. et al.	1-2	16

Systematic Index—Continued.

Form	Distribution	Page
<i>Jiaoluotherium</i>		
<i>turfanense</i> (C.)	1-8	21
<i>Juxia</i>		
<i>sharamurenense</i> C. et C.	2-4	28
spp.	2-18, 2-27	35, 43
<i>Kansupithecus</i>		
	3-9 (Mio.)	49
<i>Karakoromys</i>		
<i>decessus</i> M. et G.	HG	46
cf. <i>decessus</i> M. et G.	3-10	49
? <i>decessus</i> M. et G.	3-2	45
(?= <i>Leptotataromys</i>) sp.	HG	46
<i>Khashanagale</i>		
<i>zofiae</i> S. et M.	GA	22
?sp. nov.	GA	22
<i>Kuanchuanius</i>		
<i>shantunensis</i> C.	2-12	31
Lagomorpha		
indet.	3-3	46
<i>Lambdopsalis</i>		
<i>bullae</i> C. et Q.	1-9	21
<i>Lambdotherium</i>		
?sp.	2-1	22
<i>Lantianius</i>		
<i>xieluensis</i> C.	3-12	50
<i>Leptotataromys</i>		
<i>gracilidens</i> B.	3-10	50
<i>Linnania</i>		
<i>lofoensis</i> C. et al.	1-1	13
<i>Litolophus</i>		
<i>gobiensis</i> (C.)	2-3B	26
<i>Lofochaius</i>		
<i>brachyodus</i> C. et al.	1-1	14
<i>Lohoodon</i>		
<i>lushuiensis</i> (C.)	2-17	34
<i>Lophialetes</i>		
<i>expeditus</i> M. et G.	2-2, 2-3A,B,C, 2-5, 2-19, 2-27	24, 25, 26, 27, 28, 37, 42
cf. <i>expeditus</i> M. et G.	2-6	30
spp.	2-3A, 2-3C, 2-17, 2-19	25, 27, 34, 37
Lophialetidae		
gen. et sp. indet.	2-5, 2-18	28, 35
?gen. et sp. indet. (cf. <i>Breviodon</i>)	2-19	37
<i>Lophiodon</i>		
?sp.	2-28	44
<i>Lophiomeryx</i>		
<i>angarae</i> M. et G.	AO	47

Systematic Index—Continued.

Form	Distribution	Page
<i>gobiae</i> M. et G.	AO	47
sp.	3-8	48
<i>Lunania</i>		
<i>youngi</i> C.	2-17, 2-27	34, 43
cf. <i>youngi</i> C.	2-28	44
<i>Lushiamynodon</i>		
<i>menchiapuensis</i> C. et X.	2-17, 2-27	34, 43
<i>obesus</i> C. et X.	2-15	33
<i>sharamurenensis</i> X.	2-4	28
? <i>sharamurenensis</i> X.	2-3C	27
<i>wuchengensis</i> W.	2-18	35
cf. sp.	2-18	35
<i>Lushilagus</i>		
<i>lohoensis</i> L.	2-17	34
<i>Lushius</i>		
<i>qinlinensis</i> C.	2-17	34
<i>Manteodon</i>		
<i>youngi</i> X.	2-21	37
cf. <i>youngi</i> X.	2-19	37
<i>Matutinia</i>		
<i>nitidulus</i> L. et al.	2-25	38
<i>Meiostylodon</i>		
<i>zaoshiensis</i> W.	1-3	17
Mesonychidae		
gen. et sp. indet.	1-6, 1-7, 1-8, 2-3A, 2-19	20, 21, 24, 37
mesonychid	2-17	34
<i>Mesonyx</i>		
sp.	2-3A	24
cf. sp.	2-3C	27
?sp. nov. [" <i>M. obtusidens</i> Q."]	2-2	23
<i>Metamynodon</i>		
cf. sp.	2-27, 3-16	43, 51
<i>Metatelmatherium</i>		
cf. <i>browni</i> C.	2-26	41
<i>cristatum</i> G. et G.	2-3B	25
<i>parvum</i> G. et G.	2-3A	25
<i>Metatitan</i>		
<i>primus</i> G. et G.	3-1	44
<i>progressus</i> G. et G.	3-1	44
<i>relictus</i> G. et G.	3-1, AO	45, 47
<i>Miacis</i>		
<i>invictus</i> M. et G.	2-3A	24
<i>lushiensis</i> C.	2-17, 2-19	34, 36
sp.	2-8	30
<i>Microtitan</i>		
<i>mongoliensis</i> (O.)	2-3A,C	25, 27
sp. nov. ["?M. <i>elongatus</i> Q."]	2-2	24

Systematic Index—Continued.

Form	Distribution	Page
sp.	2-2	24
?sp. (or new genus)	2-17	34
<i>Mimolagus</i>		
<i>rodens</i> B.	3-11	50
<i>Mimotona</i>		
<i>borealis</i> C. et Q.	1-9	21
<i>robusta</i> L.	1-4	17
<i>wana</i> L.	1-4	17, 19
sp.	1-4	19
<i>Minchenella</i> (<i>Conolophus</i>)		
<i>grandis</i> Z.	1-1	13
<i>Miomeryx</i>		
<i>altaicus</i> M. et G.	AO	47
sp.	HG, AO, 3-16	46, 47, 51
<i>Mongolestes</i>		
<i>hadrodens</i> S. et G.	3-1	44
<i>Mongolonyx</i>		
<i>dolichognathus</i> S. et G.	2-3B	25
sp. nov. [" <i>M. prominens</i> "]	2-2	23
<i>Mongoloryctes</i>		
<i>auctus</i> (M. et G.)	2-3A	25
<i>Mongolotherium</i>		
<i>efremovi</i> F.	2-1, NB	22
<i>plantigradum</i> F.	NB	22
<i>Morosomys</i>		
<i>silenti</i> S.	AO	47
Multituberculata		
indet.	1-8	20
<i>Nanlingilambda</i>		
<i>chijiangensis</i> T.	1-2	16
<i>Nimravus</i>		
cf. sp.	HG	46
<i>Notomeryx</i>		
<i>besensis</i> Q.	2-26	41
<i>Obtusodon</i>		
<i>hanhuaensis</i> X.	1-4	17, 19
<i>Ochotonolagus</i>		
? <i>argyropuloi</i> G.	HG	46
<i>Olsenia</i>		
<i>mira</i> M. et G.	2-4	28
<i>Ordolagus</i>		
<i>teillhardi</i> (B.)	HG, 3-2	46, 45
<i>Pachyaena</i>		
sp.	NB, 2-1, 2-3A	22, 24
?sp.	1-1	13
<i>Pachycynodon</i>		
sp.	3-14	50

Systematic Index—Continued.

Form	Distribution	Page
<i>Pachytitan</i>		
<i>ajax</i> G. et G.	2-4	28
<i>Palaeogale</i>		
<i>parvula</i> (M. et G.)	HG	46
(= " <i>Bunaelurus</i> ") <i>ulysses</i>	HG	46
(M. et G.)		
<i>Palaeohypsodontus</i>		
<i>asiaticus</i> T.	HG	46
<i>Palaeolaginae</i>		
indet.	3-12	50
<i>Palaeoprionodon</i>		
<i>gracilis</i> M. et G.	HG	46
<i>Palaeostylops</i>		
<i>iturus</i> M. et G.	1-9, GA, NB, 2-1 ..	21, 22
<i>macrodon</i> M., G. et S.	1-9, GA, NB, 2-1 ..	22
<i>Palaeosyops</i>		
cf. sp.	2-19	37
<i>Palasiodon</i>		
<i>siurenensis</i> C. et al.	1-1	13
<i>Pantolambdaodon</i>		
<i>fortis</i> G. et G.	2-3C	27
<i>inermis</i> G. et G.	2-3C	27
?sp. nov. [" <i>P. minor</i> Q."]	2-2	23
<i>Pantolestes</i>		
?sp.	2-3A	25
<i>Pappaceras</i>		
sp.	2-18	36
<i>Pappictidops</i>		
<i>acies</i> W.	1-1	13
<i>obtusus</i> W.	1-1	13
<i>orientalis</i> Q. et L.	1-4	19
<i>Parabrontops</i>		
<i>gobiensis</i> (O.)	3-1, AO	44, 47
sp.	3-7	48
<i>Paracadurcodon</i>		
<i>suhaituensis</i> X.	3-3	47
<i>Paraceratherium</i>		
<i>lipidus</i> X. et W.	3-6	48
<i>tienshanensis</i> C.	3-6	48
sp. (small form)	3-2	45
<i>Paracynohyaenodon</i>		
<i>morrissi</i> M. et G.	2-3A	24
paramyid		
gen. et sp. nov. [" <i>Asiamys</i>	2-2	23
<i>medius</i> Q."]		
spp.	2-3A,B	24, 25
<i>Paramynodon</i>		
cf. <i>birmanicus</i> (P. et C.)	2-26	41
sp.	2-26, 2-27	41, 43

Systematic Index—Continued.

Form	Distribution	Page
<i>Paranictops</i>		
<i>majuscula</i> Q.	1-4	19
sp.	1-4	19
<i>Paratriisodon</i>		
<i>gigas</i> C. et al.	2-3B, 2-17	25, 34
<i>henanensis</i> C.	2-17	34
<i>Pastoralodon</i>		
<i>lacustris</i> C. et Q.	1-9	22
? <i>lacustris</i> C. et Q.	2-1	22
<i>Pastoralodontidae</i>		
indet.	1-6	20
<i>Perissodactyla</i>		
indet.	3-3	47
<i>Petroleumur</i>		
<i>brevirostre</i> T.	1-1	13
<i>Phenaceras</i>		
<i>lacustris</i> T.	2-23	38
<i>Phenacolophidae</i>		
gen. et sp. nov.	1-1	13
<i>Phenacolophus</i>		
<i>fallax</i> M. et G.	GA	22
<i>Plagiocristodon</i>		
<i>serratus</i> C. et Q.	1-9, 2-1	21, 22
cf. <i>Plesictis</i>		
sp.	HG	46
<i>Plesiosminthus</i>		
<i>asiaecentralis</i> (B.)	3-9	49
<i>parvulus</i> (B.)	3-9	49
<i>tangingoli</i> (B.)	HG, 3-9	46, 49
sp.	2-13	31
<i>Praolestes</i>		
<i>nanus</i> M. et G.	GA	46
<i>Primates</i>		
indet.	3-9	49
<i>Prionessus</i>		
<i>lucifer</i> M. et G.	1-9, GA, 2-1	21, 22
cf. <i>Proailurus</i>		
sp.	HG	46
? <i>Probathyopsis</i>		
<i>sinyüensis</i> C. et T.	2-24	38
<i>Proboscidea</i>		
sp.	3-9 (Mio.)	49
<i>Probrachyodus</i>		
<i>panchiaoensis</i> X. et C.	2-27	43
?sp. nov.	2-26	41
<i>Procaprolagus</i>		
<i>radicidens</i> (T.)	3-2	45
<i>vetustus</i> (B.)	3-1, HG	44, 46

Systematic Index—Continued.

Form	Distribution	Page
<i>Prodinoceras</i>		
<i>diconicus</i> T.	1-8	21
<i>martyr</i> M. et G.	GA	22
<i>Prodinoceratinae</i>		
gen. et sp. indet.	2-14	33
<i>Prohyracodon</i>		
<i>meridionalis</i> C. et X.	2-27	43
cf. <i>meridionalis</i> C. et X.	2-13	33
cf. <i>orientale</i> K.	2-27	43
<i>progressa</i> C. et X.	2-27	43
sp. ("Caenolophus cf. <i>promissus</i> ")	2-13	33
spp.	2-17, 2-19, 2-26, ... 2-27, 2-28	34, 37, 41, 43, 44
<i>Prolaena</i>		
<i>parva</i> X. et al.	2-19	36
<i>Propachynolophus</i>		
<i>hengyangensis</i> (Y.)	2-25	40
<i>Propalaeotherium</i>		
<i>sinensis</i> Z.	2-12	31
<i>Propterodon</i>		
<i>irdinensis</i> M. et G.	2-3A, 2-17	24, 34
<i>Prosciurus</i>		
<i>arboraptus</i> S.	HG	46
<i>lohiculus</i> M. et G.	HG	46
<i>Protembolotherium</i>		
<i>efremovi</i> J.	AO	47
<i>Protitan</i>		
<i>bellus</i> G. et G.	2-3C	27
? <i>cingulatus</i> G. et G.	2-3B	25
<i>grangeri</i> (O.)	2-3A, 2-17	25, 34
<i>minor</i> G. et G.	2-3B	25
<i>obliquidens</i> G. et G.	2-3A	25
<i>robustus</i> G. et G.	2-3A	25
cf. <i>robustus</i> G. et G.	2-27	42
?spp.	2-19, 2-26	37, 41
<i>Pseudanisonchus</i>		
<i>antelios</i> Z. et al.	1-2	16
<i>Pseudictops</i>		
<i>chaii</i> T.	1-8	21
<i>lophiodon</i> M., G. et S.	1-9, GA, NB, 2-1 ...	21, 46, 22
cf. <i>tenuis</i> D. et Z.	1-2	16
<i>Pseudictopidae</i>		
indet.	1-6	20
<i>Pseudocylindrodon</i>		
<i>mongolicus</i> K.	HG	46
<i>Pseudomeryx</i>		
<i>gobiensis</i> T.	HG	46
<i>Pterodon</i>		
<i>dakhoensis</i> C.	2-27	43

Systematic Index—Continued.

Form	Distribution	Page
<i>hyaenoides</i> M. et G.		
<i>mongoliensis</i> (D.)	2-4	28
AO		47
<i>Pyrodon</i>		
<i>xinjiangensis</i> Z.	2-5	29
sp.	2-1	22
<i>Rhinocerotidae</i>		
indet.	2-18, 2-27, ... HG, 3-9	36, 43, 46, 49
small rhinocerotid	3-10	50
<i>Rhinotitan</i>		
<i>andrewsi</i> (O.)	2-4	28
<i>kaiseni</i> (O.)	2-4	28
<i>mongoliensis</i> (O.)	2-4, 2-13	28, 32
<i>quadridens</i> X. et C.	2-27	43
spp.	2-5, 2-27	28, 42
<i>Rhodopagus</i>		
? <i>minimus</i> (M. et G.)	2-4	28
<i>pygmaeus</i> R.	2-3C, 2-27	27, 43
? <i>pygmaeus</i> R.	2-3A	25
sp.	2-12, 2-13, ... 2-27	31, 32, 43
<i>Rhombomylus</i>		
<i>laianensis</i> Z. et al.	2-22	37
<i>turpanensis</i> Z.	2-5	29
sp.	2-20	37
<i>Rodentia</i>		
indet.	1-9, 2-12, 3-3 ...	21, 31, 46
<i>Sarcodon</i>		
<i>pygmaeus</i> M. et G.	1-9, GA	21, 46
<i>Sarkastodon</i>		
<i>mongoliensis</i> G.	2-3A	24
<i>Sayimys</i>		
<i>obliquidens</i> B.	3-9 (Mio.)	49
<i>Schizotherium</i>		
<i>avitum</i> M. et G.	AO, 3-2	47, 45
<i>nabanensis</i> Z.	3-15	51
spp.	3-1, 3-4, 3-6, ... 3-9, 3-15	45, 47, 48, 49, 51
<i>Schlosseria</i>		
<i>magister</i> M. et G.	2-2	22, 23
cf. <i>magister</i> M. et G.	2-3B	26
sp. nov. ["S. <i>dimera</i> Q."]	2-2	23
sp. nov. ["S. <i>masculus</i> Q."]	2-2	23
sp.	2-28	44
"Sciuravus"		
sp.	2-19	36
<i>Sciuravidae</i>		
gen. et sp. nov.	2-17	34
<i>Sciuridae</i>		
gen. et sp. indet.	3-10	49

Systematic Index—Continued.

Form	Distribution	Page
" <i>Sciurus</i> "		
sp.	3-9	49
<i>Selenomys</i>		
<i>mimicus</i> M. et G.	HG	46
<i>Shamolagus</i>		
<i>grangeri</i> B.	2-3C	27
<i>medius</i> B.	2-4	28
<i>Sianodon</i>		
<i>bahoensis</i> X.	3-12	50
<i>chiyuanensis</i> C. et X.	2-15	33
<i>honianensis</i> C. et X.	2-17	34
<i>mienchiensis</i> C. et X.	2-13	33
<i>sinensis</i> (Z.)	2-13, 2-15, 2-18	32, 33, 35
<i>ulaisuensis</i> X.	2-4	28
spp.	2-4, 2-16, 2-19, 3-3, 3-12	28, 33, 37, 47, 50
Sicistinae		
?spp.	3-9	49
indet.	3-10	50
<i>Simplaletes</i>		
<i>sujiensis</i> Q.	2-3A	25
<i>ulanshierhensis</i> Q.	2-3C	27
<i>Sinologomys</i>		
<i>gracilis</i> B.	3-10	49
<i>kansuensis</i> B.	3-6, 3-9, 3-10	48, 49
<i>major</i> B.	3-9, 3-10	49
cf. <i>major</i> B.	3-2	45
" <i>Sinopa</i> "		
?sp.	2-19	36
<i>Sinostylops</i>		
<i>progressus</i> T. et Y.	1-5	20
<i>promissus</i> T. et Y.	1-4	17
Soricidae		
indet.	AO, 3-9	47, 49
<i>Sphenopsalis</i>		
<i>nobilis</i> M., G. et S.	1-9, GA	21, 46
<i>Stenanagale</i>		
<i>xiangensis</i> W.	1-3	17
<i>Stylinodon</i>		
?sp.	2-17	34
<i>Symphysorrhachis</i>		
<i>brevirostris</i> B.	AO	47
<i>Tachyoryctoides</i>		
<i>intermedius</i> B.	3-10	50
<i>obrutschewi</i> B.	HG, 3-10	46, 50
<i>pachygnathus</i> B.	HG, 3-10	46, 50
sp.	3-9	49
?Talpidae		
indet.	3-9	49

Systematic Index—Continued.

Form	Distribution	Page
<i>Tamquammys</i>		
<i>wilsoni</i> D., L. et Q.	2-2	23
Tapiroidea		
gen. et sp. nov.	2-2	23
[" <i>Euryletes medius</i> Q."]		
gen. et sp. nov.	2-2	23
[" <i>Euryletes magnus</i> Q."]		
gen. et sp. nov.	2-2	23
[" <i>Euryletes minimus</i> Q."]		
indet.	3-12	50
<i>Tataromys</i>		
<i>deflexus</i> T.	3-2, HG	45, 46
<i>gobiensis</i> K.	HG	46
<i>grangeri</i> B.	3-9	49
cf. <i>grangeri</i> B.	HG	46
<i>plicidens</i> M. et G.	HG, 3-2	46, 45
cf. <i>plicidens</i> M. et G.	3-9, 3-10	49
<i>sigmodon</i> M. et G.	HG, 3-9	46, 49
cf. <i>sigmodon</i> M. et G.	3-6	48
<i>Teilharadia</i>		
<i>pretiosa</i> M. et G.	2-3C, 2-27	27, 43
?sp.	2-27	43
<i>Teleolophus</i>		
<i>liankanensis</i> Z.	2-5	28
<i>magnus</i> R.	3-1	44
cf. <i>magnus</i> R.	2-27	43
<i>medius</i> M. et G.	2-3A, 2-27	25, 43
cf. <i>medius</i> M. et G.	2-3B, 2-3C, 2-19	26, 27, 37
? <i>medius</i> M. et G.	2-3C	27
<i>sichuanensis</i> X. et al.	2-19	37
sp. nov. [" <i>T. rectis</i> Q."]	2-2	24
sp. nov. [" <i>T. primarius</i> Q."]	2-2	24
sp.	2-26, 2-27, 2-28, 3-1	41, 43, 44, 45
<i>Thinocyon</i>		
? <i>sichowensis</i> C.	2-12	31
<i>Tienschaniolophus</i>		
<i>lianmuqinensis</i> T.	1-8	21
<i>shengjinkouensis</i> T.	1-8	21
<i>subashiensis</i> T.	1-8	21
Tillodontia		
gen. et sp. nov.	2-2	23
[" <i>Ulanius chowi</i> Q."]		
gen. et sp. indet.	2-13, 2-27	32, 42
<i>Titanodectes</i>		
<i>ingens</i> G. et G.	3-1, AO	44, 47
<i>minor</i> G. et G.	2-4, 3-1	28, 44
Tragulidae		
indet.	2-26	41
?indet.	3-6	48

Systematic Index—Continued.

Form	Distribution	Page
<i>Triplopus</i>		
<i>proficiens</i> (M. et G.)	2-3A, 2-3C	25, 27
? <i>progressus</i> (M. et G.)	2-4	28
<i>Tritemnodon</i>		
?sp.	2-19	36
<i>Tsaganomys</i>		
<i>altaicus</i> M. et G.	HG, 3-2, 3-10	46, 45, 50
<i>Tsinlingomys</i>		
<i>youngi</i> L.	2-17	34
<i>Tupaiodon</i>		
? <i>minutus</i> M. et G.	HG	46
<i>morrissi</i> M. et C.	HG	46
?sp.	2-8	46
?cf. <i>Uintatherium</i>		
sp.	2-12	31
<i>Uintatheriinae</i>		
indet.	2-17	34
<i>Ulausuodon</i>		
<i>parvus</i> H.	2-4	28
<i>Urtinotherium</i>		
<i>incisivum</i> C. et C.	3-1	44
sp. nov. [“?U. minor Q.”]	2-2	24
<i>Wanogale</i>		
<i>hodungensis</i> X.	1-4	19
<i>Wanotherium</i>		
<i>xuanchengensis</i> T. et Y.	1-5	20
<i>Xinjiangmeryx</i>		
<i>parvus</i> Z.	2-5	29
<i>Xinyüictis</i>		
<i>tenuis</i> Z. et al.	2-24	38
<i>Yantanglestes</i>		
(<i>Lestes</i>) <i>conenxus</i> (Y. et T.)	1-4	20
(<i>Lestes</i>) <i>datangensis</i> (W.)	1-1	13
(<i>Dissacus</i>) <i>feiganensis</i> (C. et al.)	1-1	13
<i>Yindirtemys</i>		
<i>woodi</i> B.	3-9	49
<i>Yuelophus</i>		
<i>validus</i> Z.	1-1	13
<i>Yuodon</i>		
<i>protoselenoides</i> C. et al.	1-1	13
<i>Yuomys</i>		
<i>cavioides</i> L.	2-4, 2-13, 2-15	28, 32, 33
<i>elegans</i> W.	2-18	35
sp. nov.	2-17	34
<i>Zeuchtherium</i>		
<i>niteles</i> T. et Y.	1-4	19

Stratigraphic Formation Index

Pin-yin	English	Age	Page
—	Ardyn Obo Formation	Early Oligocene	47
—	Arshanto Formation	Middle Eocene	22
Bai-lu-yuan Formation	Pai-lu-yuan Formation	Early Oligocene	50
Bai-shui-cun Formation	Pai-shui-tsun Formation	Early Oligocene	31, 50
—	Bayan Ulan Formation	Early Oligocene	22
Cai-jia-chong Formation	Tsai-chia-chung Formation	Early Oligocene	51
Cha-gan-bu-la-ge Formation	Cha-gan-bu-la-ge Formation	Early Oligocene	45
Chi-jiang Formation	Chih-kiang Formation	Late Paleocene	15
Chang-xin-dian Formation	Chang-sin-tien Formation	Late Eocene	30
Chuan-kou Formation	Chuan-kou Formation	Middle Eocene	33
Chu-gou-yu Formation	Chu-kou-yu Formation	Late Eocene	34
Da-bu Formation	Ta-pu Formation	Early Eocene	28
Da-cang-fang Formation	Ta-tsang-fang Formation	Middle Eocene	36
Da-tang Member	Ta-tang Member	Late Paleocene	13
Da-yu Formation	Ta-yu Formation	?Oligocene	34
Da-zhang Formation	Ta-chang Formation	Late Paleocene	20
Dai-jia-ping Formation	Te-chia-ping Formation	Cretaceous	17
Dan-xia Formation	Tan-hsia Formation	?Eocene	13
Dong-hu Formation	Tung-hu Formation	Early Eocene	37
Dong-jun Formation	Tung-chun Formation	Late Eocene	40
Dou-mu Formation	Tou-mu Formation	Late Paleocene	17
Gao-yu-gou Formation	Kou-yu-kou Formation	Middle Paleocene	20
—	Gashato Formation	Late Paleocene	22
Gong-kang Formation	Kung-kang Formation	Early Oligocene	40, 50
Guan-zhuang Formation	Kuan-chuang Formation	Middle Eocene	31
He-se Formation	Ho-se (Brown) Formation	Middle Oligocene	48
He-tao-yuan Formation	Ho-tao-yuan Formation	Late Eocene	36
He-ti Formation	Ho-ti Formation	Late Eocene	31
Hong-he Formation	Hung-ho Formation	Late Eocene	30
Hong-li-shan Formation	Hung-li-shan Formation	Late Eocene	30
—	Houldjin Formation	Middle Oligocene	44
—	Hsanda Gol Formation	Middle Oligocene	46
Hu-gang Formation	Hu-kang Formation	Cretaceous	36
Huang-gang Formation	Huang-kang Formation	Miocene	37
Hun-shui-he Formation	Hun-shui-ho Formation	Late Eocene	33
—	Irdin Manha Formation	Late Eocene	24
Ji-yuan Formation	Chi-yuan Formation	Late Eocene	33
Lan-ni-keng Member	Lan-ni-keng Member	Late Paleocene	15
Li-jiang Formation	Li-kiang Formation	?Eocene	43
Li-shi-gou Formation	Li-shih-kou Formation	Late Eocene	35
Lian-kan Formation	Lien-kan Formation	Late Eocene	28
Lin-jiang Formation	Lin-kiang Formation	?Oligocene	38
Ling-cha Formation	Ling-cha Formation	Early Eocene	38
Ling-shan locality	Ling-shan locality	Late Eocene	30
Liu-niu Formation	Liu-niu Formation	? Eocene	40
Lu-mei-yi Formation	Lu-mei-yi Formation	Late Eocene	41
Lu-se Formation	Lu-se (Green) Formation	Late Eocene	30
Lu-shi Formation	Lu-shi Formation	Late Eocene	34
Mao-jia-po Formation	Mao-chia-po Formation	Late Eocene	35
Meng-yin Series	Meng-yin Series	Cretaceous	31
Na-duo Formation	Na-duo Formation	Late Eocene	40
Nan-chao Formation	Nan-chao Formation	Cretaceous	33
Nan-xiong Group	Nan-hsiung Group	Cretaceous	13
Nao-mu-gen Formation	No-mo-gen Formation	Late Paleocene	22
—	Naran Bulak Formation	Early Eocene	22
Nau-gon-dai Formation	Nau-gon-dai Formation	Middle Oligocene	45
Ning-jia-shan Member	Ning-shia-shan Member	Early Eocene	38

Stratigraphic Formation Index—Continued.

Pin-yin	English	Age	Page
Niu-shan Member	Niu-shan Member	Early Eocene	30
Nong-shan Formation	Nung-shan Formation	Late Paleocene	13
Ping-hu Formation	Ping-hu Formation	Early Eocene	15, 38
Qing-feng-qiao Formation	Ching-feng-chiao Formation	Cretaceous	38
Qing-shui-ying Formation	Ching-shui-ying Formation	Middle Oligocene	47
Qiu-ba Formation	Chiu-pa Formation	Cretaceous	20
Ren-cun Member	Jen-tsun Member	Late Eocene	31
San-sheng-kung	Saint Jacques	Middle Oligocene	45
—	Shara Murun Formation	Late Eocene	27
Shang-hu Formation	Shang-hu Formation	Early-Middle Paleocene	13
—	Shar-gal-tein	Late Oligocene	49
Shi-san-jian-fang Formation	Shih-san-chien-fang Formation	Early Eocene	28
Shi-zi-kou Formation	Shih-tze-kou Formation	Early-Middle Paleocene	15
Shih-chiang-tzu-ku	Shih-chiang-tzu-ku	Late Oligocene	49
Shih-ehr-ma-cheng	Shih-ehr-ma-cheng	?Early Oligocene	50
Shuang-ta-si Group	Shuang-ta-ssu Group	Late Paleocene	20
Shun-shan-ji Formation	Shun-shan-chi Formation	Paleocene	37
Su-ba-shi Formation	Su-pa-shih Formation	Cretaceous	20
—	Tabenbuluk	Late Oligocene	48
Tai-zi-cun Formation	Tai-tzu-tsun Formation	Late Paleocene	20
Tan-tou Formation	Tan-tou Formation	Early Eocene	20, 33
Tao-shu-yuan-zi Group	Tao-shu-yuan-tze Group	Oligocene	48
—	Ulan Gochu Formation	Early Oligocene	44
U-lun-gur Formation	Wu-lun-ku Formation	Late Eocene	30
—	Urtyn Obo Formation	Early Oligocene	44
Wang-he Formation	Wang-ho Formation	Cretaceous	17
Wang-hu-dun Formation	Wang-hu-tun Formation	Early-Middle Paleocene	17
Wang-wu Member	Wang-wu Member	Late Paleocene	15
Wu-li-dui Formation	Wu-li-tui Formation	Late Eocene	35
Wu-tao-ya-yu	Wu-tao-ya-yu	Late-Middle Oligocene	49
Wu-tu Formation	Wu-tu Formation	Early Eocene	30
Xiang-cheng Group	Hsiang-cheng Group	Paleocene-Eocene	33
Xiang-shan Formation	Hsiang-shan Formation	Late Eocene	43
Xiao-tun Formation	Hsiao-tun Formation	Early Oligocene	41, 51
Xin-yu Group	Sin-yu Group	Eocene	38
Xuan-nan Formation	Hsuan-nan Formation	Cretaceous	20
—	Yindirte	Late Oligocene	48
Yu-huang-ding Formation	Yu-huang-ting Formation	Early Eocene	36
Yuan-qu Series (Group)	Yuan-chu Series (Group)	Late Eocene-Oligocene	31
Zhai-li Member	Chai-li Member	Late Eocene	31
Zhang-shan-ji Formation	Chang-shan-chi Formation	Early Eocene	37
Zao-shi Formation	Zhao-shih Formation	Middle Paleocene	17
Zhu-gui-keng Member	Chu-kuei-keng Member	Late Paleocene	13

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Appendix I.—*A comparative list of the Chinese authors' names in English and Pinyin.*

Pinyin	English	Chinese
Chen Guan-fang	- - -	陈冠芳
Ding Su-yin	Ting Su-yin	丁素因
Hu Chang-kang	Hu Chang-kang	胡长康
Hu Cheng-zhi	- - -	胡承志
Huang Wan-po	Huang Wan-po	黄万波
Huang Xue-shi (h)	- - -	黄学诗
Ji Hong-xiang	Chi Hung-giang	计宏祥
Jia Lan-po	Chia Lan-po	贾兰坡
Li Chuan-kui	Li Chuan-kuei	李传夔
Liu Dong-sheng	Liu Tung-sen	刘东生
Liu Xian-ting	Liu Hsian-ting	刘宪亭
Pei Wen-zhong	Pei Wen-chung	裴文中
Qi Tao	Chi Tao	齐陶
Qiu Zhan-xiang	Chiu Chan-siang	邱占祥
Qiu Zhu-ding	Chiu Chu-ting	邱铸鼎
Tang Xin	Tang Hsin	唐鑫
Tang Ying-jun	- - -	汤英俊
Tong Yong-sheng	Tung Yung-sheng	童永生
Wang Ban-yue	- - -	王伴月
Wang Jing-wen	- - -	王景文
Wu Ru-kang	Woo Ju-kang	吴汝康
Wu Wen-yu	- - -	吴文裕
Xu Qin-qi	- - -	徐钦琦
Xu Yu-xuan	Hsu Yu-hsiuan	徐余瑄
Xue Xiang-xi	Hsieh Hsiang-hsu	薛祥煦
Yan De-fa	- - -	阎德发
Yang Zhong-jian	Young Chung-chien	杨钟健
Ye Xiang-kui	Yeh Hsiang-kuei	叶祥奎
You Yu-zhu	- - -	尤玉柱
Zhai Ren-jie	Chai Jen-chieh	翟人杰
Zhang Yu-ping	Chang Yu-ping	张玉萍
Zhen Shou-nan	- - -	甄朔南
Zheng Jia-jian	Cheng Chia-chien	郑家坚
Zhou Ming-zhen	Chow Min-chen	周明镇

Appendix II.—A comparative table of the localities in "Conventional English" or Wade-giles and Pinyin.

Pinyin	Wade-giles	"Conventional English"	Chinese
Ai-li-ge-miao	Ai-li-ke-miao	- - -	艾力格庙
Al-xa Zuo-qi	A-lia-shan Tso-chi	- - -	阿拉善左旗
An-hui (sheng)	An-hui (sheng)	Anhui (province)	安徽(省)
An-ji-hai	An-chi-hai	Ansihai	安集海
An-ren-cun	An-jen-tsun	Anjentsun	安仁村
- - -	- - -	Arshanto	阿山头
Ba-he	Pa-ho	Paho	灞河
Bai-lu-yuan	Pai-lu-yuan	Pailuyuan	白鹿原
Bai-shui-cun	Pai-shui-tsun	Paishuitsun	白水村
Ban-qiao	Pan-ch'iao	Panchiao	板桥
- - -	- - -	Baron Sog Mesa	巴润绍高地
Bayan Gol	Pa-yen Kao-le	Bayan Gol (Teng kow)	巴彦高勒
- - -	- - -	Bayen Ulan	巴彦乌兰
Bei-jing	Pei-ching	Peking	北京
Bo-se	Pai-se	Baise	百色
- - -	- - -	Camp Margetts	马捷茨营地
Cai-jia-chong	Tsai-chia-chung	Tsaichiachung	蔡家冲
Cha-gan-bu-la-ge	- - -	- - -	查干布拉格
Cha-ling	Ch'a-ling	Chaling	茶陵
Chang-xin-dian	Chang-hsin-tien	Changsintien	长辛店
Chi-jiang	Ch'ih-chiang	Chihkiang	池江
- - -	- - -	Chimney Butte	烟囱山
Chu-gou-yu	Chu-kou-yu	Chukouyu	锄沟峪
Chuan-kou	Chuan-kou	Chuankou	川口
Da-bu	Ta-pu	Tapu	大步
Da-cang-fang	Ta-tsang-fang	Tatsangfang	大仓房
Da-jian	Ta-chien	Tachien	大尖
Da-ke	Ta-ko	Dahko	大可
Da-tang	Ta-t'ang	Tatang	大塘
Da-ye-ma-ban	Ta-yeh-ma-pan	Tayehmapan	大野马伴
Da-yu	Ta-yü	Tayu	大庾
Da-zhang	Ta-chang	Tachang	大章
Dan-xia	Tan-hsia	Tanya	丹霞

Appendix II.—Continued.

Pinyin	Wade-giles	"Conventional English"	Chinese
Dang-he	Tang-ho	Tongho	党河
Deng-fang	Teng-fang	Tengfang	邓坊
Deng-kou	Teng-kou	Tengkow	磴口
Ding-chi-ling	Ting-chih-ling	Tingchiiling	钉池岭
Dong-hu	Tung-hu	Tunghu	东湖
Dong-jun	Tung-chün	Tungchun	洞均
Dou-mu	Tou-mu	Toumu	痘母
Dun-huang	Tun-huang	Tunhuang	敦煌
- - -	- - -	East Mesa	东高地
Fei-yue	Fei-yüeh	Feiyueh	飞跃
Gao-po	Kao-po	Kaopo	高坡
- - -	- - -	Gashato	格沙头
Gong-kang	Kung-k'ang	Kungskang	公康
Gu-yuan	Ku-yüan	Kuyuan	固原
Guan-zhuang	Kuan-chuang	Kuanchuang	官庄
Guang-dong (sheng)	Kuang-tung (sheng)	Kwantung (province)	广东(省)
Guang-xi (Zhuang-zu Zi-zhi-qu)	Kuang-hsi (Chuang-tze Tzu-chih-ch'u)	Kwangsi (Chuang Autonomous Region)	广西 (僮族自治区)
Gui-zhou (sheng)	Kuei-chow (sheng)	Kweichow (province)	贵州(省)
Ha-mi	Ha-mi	Hami	哈密
Han-hua-wu	Han-hua-wu	Hanhuawu	韩花屋
He-bei (sheng)	Ho-pei (sheng)	Hopei (province)	河北(省)
He-nan (sheng)	Ho-nan (sheng)	Honan (province)	河南(省)
He-tao-yuan	Ho-tao-yuan	Hetaoyuan	核桃园
He-ti	Ho-ti	Hoti	河堤
Heng-dong	Heng-tung	Hengtung	衡东
Heng-yang	Heng-yang	Hengyang	衡阳
Hong-he	Hung-ho	Hungho	红河
Hong-qin-bao	Hung-chin-pao	Hungchinpao	红庆堡
Hos Burd	Hao-ssu-pu-ehr-tu	- - -	豪斯布尔都
- - -	- - -	Houldjin	呼尔井
- - -	- - -	Hsanda Gol	山达河
Hu-bei (sheng)	Hu-pei (sheng)	Hupei (province)	湖北(省)

Appendix II.—Continued.

Pinyin	Wade-giles	"Conventional English"	Chinese
Hu-he-bol-he	- - -	- - -	呼和浩特
Hu-nan (sheng)	Hu-nan (sheng)	Hunan (province)	湖南(省)
Hui-hui-pu	Hui-hui-pu	Huihuipu	惠回堡
Hun-shui-he	Hun-shui-ho	Hunshuiho	浑水河
Huo-yan-shan	Huo-yan-shan	Huoyanshan	火焰山
Eren-hot	Erh-lien-hao-t'ie	Iren Dabasu	二连浩特
- - -	- - -	Irdin Manha	伊尔丁曼哈
Jar-tai	Chi-lan-tai	Chilantai (salt lake)	吉兰泰(盐池)
Ji-yuan	Chi-yüan	Tsiyuan	济源
Jiang-xi (sheng)	Chiang-hsi (sheng)	Kiangsi (province)	江西(省)
- - -	- - -	Jhamo Obo	章干敖包
Jun-xian	Chün-hsien	Kunhsien	均县
Jung-gar	Chun-ko-erh	Dzungar	准噶尔
Kang-wan-gou	Kang-wan-kou	Kangwankou	康湾沟
Lai-an	Lai-an	Laian	来安
Lan-tian	Lan-tien	Lantien	兰田
Li-guan-qiao	Li-kuan-chiao	Likuanchiao	李官桥
Li-jia-lao-wu	Li-chia-lao-wu	Lichialaowu	李家老屋
Li-jiang	Li-chiang	Likiang	丽江
Li-mu-ping	Li-mu-p'ing	Limuping	栗木坪
Li-shi-gou	Li-shih-kou	Lishihkou	李士沟
Lian-kan	Lien-k'an	Lienkan	连坎
Lian-mu-xin	Lien-mu-hsin	Lienmusin	连木沁
Lin-qu	Lin-ch'ü	Linchu	临朐
Lin-jiang	Lin-chiang	Linkiang	临江
Lin-tong	Lin-t'ung	Lintung	临潼
Ling-bao	Ling-pao	Lingpao	灵宝
Ling-cha	Ling-ch'a	Lingcha	岭茶
Ling-shan	Ling-shan	Lingshan	灵山
Ling-wu	Ling-wu	Lingwu	灵武
Liu-niu	Liu-niu	Liuniu	六咀
Lu-mei-yi	Lu-mei-yi	Lumeiyi	路美邑
Lu-nan	Lu-nan	Lunan	路南

Appendix II.—Continued.

Pinyin	Wade-giles	"Conventional English"	Chinese
Lu-shi	Lu-shih	Lushi	卢氏
Luan-chuan	Luan-ch'uan	Luanchuan	栾川
Luo-fu-zhai	Lo-fu-chai	Lofochai	罗佛寨
Luo-nan	Lo-nan	Lonan	洛南
Luo-ping	Lo-p'ing	Loping	罗平
Ma-gu-shan	Ma-ku-shan	Makushan	麻姑山
Ma-na-s	Ma-na-ssu	Manas	玛纳斯
Mao-jia-po	Mao-chia-po	Maochiapo	毛家坡
Mao-xi-cun	Mao-hsi-tsun	Maositsun	毛西村
Mei-zi-xi	Mei-tsu-hsi	Meitzesi	梅子溪
Meng-jia-po	Meng-chia-po	Menchiapu	孟家坡
Meng-yin	Meng-yin	Mengyin	蒙阴
Mian-chi	Mien-chih	Mienchih	澠池
Na-duo	Na-tu	Nado	那读
Na-lou	Na-lou	Nalou	那楼
Nan-kang	Nan-kang	Nankang	南康
Nan-xiong	Nan-hsiung	Nanhsiung	南雄
Nao-mu-gen	- - -	Nomogen	脑木根
- - -	- - -	Naran Bulak	纳伦布拉克
Nei Mong-gol	Nei-meng-ku	Inner Mongolia	内蒙古(自治区)
(Zi-zhi-qu)	(Tzu-chih-chü)		
- - -	- - -	Nemegt	奈玛盖特
Ning-jia-shan	Ning-chia-shan	Ningchiashan	宁家山
Ning-xia (Hui-zu Zi-zhi-qu)	Ning-hsia (Hui-tsu Tzu-chih-ch'ü)	Ningsia (Hui Autonomous Region)	宁夏 (回族自治区)
Niu-shan	Niu-shan	Niushan	牛山
- - -	- - -	Nom Khong Obo (Shireh)	脑木根敖包
- - -	- - -	North Mesa	北高地
Nong-shan	Nung-shan	Nunshan	浓山
Ping-hu	P'ing-hu	Pinghu	坪湖
Qi-ke-tai	Chi-ko-tai	Chiketai	七克台
Qian-shan	Ch'ien-shan	Chienshan, Tsienshan	潜山
Qin-ling	Ch'in-ling	Tsinling (mountain)	秦岭(山脉)

Appendix II.—Continued.

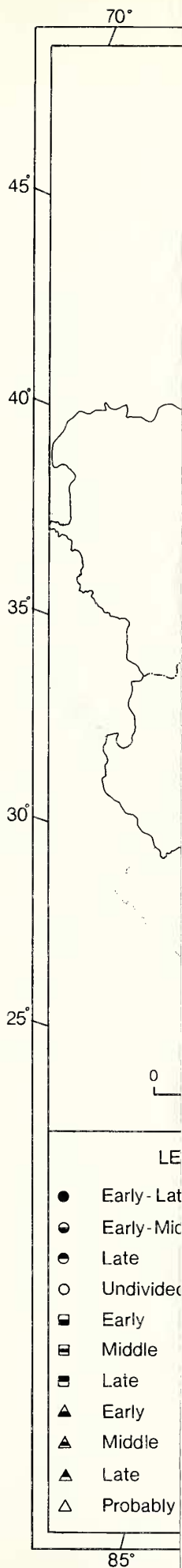
Pinyin	Wade-giles	"Conventional English"	Chinese
Qing-shui-ying	Ch'ing-shui-ying	Chingshuiying	清水营
Qu-jing	Ch'ü-ching	Chuching	曲 靖
Qu-yang	Ch'ü-yang	Chuyang	曲 阳
Ren-cun	Jen-ts'un	Jentsun	任 村
San-sheng-gong	San-sheng-kung	Saint Jacques, Santancho, Santaolo	三盛公
Shan-dong (sheng)	Shan-tung (sheng)	Shantung (province)	山东(省)
Shan-shan	Shan-shan	Shanshan	鄯 善
Shan-xi (sheng)	Shan-hsi (sheng)	Shansi (province)	山西(省)
Shaan-xi (sheng)	Shaan-hsi (sheng)	Shensi (province)	陕西(省)
Shang-hu	Shang-hu	Shanghu	上 湖
Shang-xiu-ren	Shang-hsiu-jen	Shangsiujen	上修仁
- - -	- - -	Shargaltein	沙拉果勒
Sheng-jin-kou	Sheng-chin-kou	Shengchinkou	胜金口
Shi-er-ma-cheng	- - -	Shih-ehr-ma-cheng	十二马厂
Shi-men	Shih-men	Shihmen	石 门
Shi-san-jian-fang	Shih-san-chien-fang	Shisanchienfang	十三间房
Shi-zi-kou	Shih-tzu-k'ou	Shitzekou	狮子口
Shi-zong	Shih-tsung	Shihtsung, Shichong	师 宗
- - -	- - -	Shihchiangtzuku	石羌子沟
Shuang-ta-si	Shuang-t'a-ssu	Shuangtassu	双塔寺
Si-zi-wang Qi	Ssu-tzu-wang Ch'i	- - -	四子王旗
Su-ba-shi	- - -	- - -	苏巴什
Su-ji-deng-en-ji (Mesa)	- - -	- - -	苏吉登恩吉
Su-hait	Su-hai-tu	Suhaitu	苏海图
Tai-zi-cun	T'ai-tzu-t'sun	Taitzetsun	台子村
Tan-tou	T'an-t'ou	Tantou	潭 头
Tao-shu-yuan-zi	T'ao-shu-yuan-tzu	Taoshuyuantze	桃树园子
Tamu Bulak	- - -	Taben Buluk	塔崩布鲁克
Tian-dong	T'ien-tung	Tientung	田 东
Tian-yang	T'ien-yang	Tienyang	田 阳
Tong-bai	Tung-pai	Tungpeh	桐 柏
Tong-xin	Tung-hsin	Tungsin	同 心

Appendix II.—Continued.

Pinyin	Wade-giles	"Conventional English"	Chinese
Turpan	T'u-lu-p'an	Turfan	吐鲁番
- - -	- - -	Tukhum	土克木
- - -	- - -	Twin Oboes	双孛山
- - -	- - -	Ulan Usu	乌拉乌苏
- - -	- - -	Ulan Gochu	乌兰格楚
- - -	- - -	Ulan Shireh	乌兰希热
Ulungur	Wu-lun-ku	Ulungur	乌伦古
- - -	- - -	Urtyn Obo	乌尔登敖包
Wan-lie	Wan-lieh	Wanlieh	晚列
Wang-da-wu	Wang-ta-wu	Wangtawu	汪大屋
Wang-he	Wang-ho	Wangho	王河
Wang-hu-dun	Wang-hu-tun	Wanghutun	望虎墩
Wei-nan	Wei-nan	Weinan	渭南
Wu-cheng	Wu-ch'eng	Wucheng	吴城
Wu-li-dui	Wu-li-tui	Wulitui	五里堆
Wu-tu	Wu-tu	Wu-tu	五图
- - -	- - -	Wutaoyayu	五道埡峪
Xi-an	Hsi-an	Sian	西安
Xi-chuan	Hsi-ch'uan	Sichuan	渐川
Xi-jia-dian	Hsi-chia-tien	Sichiatien	习家店
Xi-xi-zhou	Hsi-hsi-chou	Sisichow	西西周
Xar-Moron	- - -	Shara Murun	锡拉木伦
Xia-meng-tang	Hsia-meng-tang	Siamengtang	下孟塘
Xia-xiu-ren	Hsia-hsiu-jen	Siasiujen	下修仁
Xiang-shan	Hsiang-shan	Siangshan	象山
Xiao-sha-he	Hsiao-sha-ho	Siaoshaho	小沙河
Xiao-tun	Hsiao-tun	Siaotun	小屯
Xie-hu	Hsieh-hu	Hsiehhu	泄湖
Xin-cun-li	Hsin-tsun-li	Sintsunli	新村里
Xin-jiang (Weiwu'er Zi-zhi-qu)	Hsin-chiang (Wei-wu-erh Tzu-chih-Ch'u)	Sinkiang (Uygur Autonomous Region)	新疆 (维吾尔自治区)
Xin-jie	Hsin-chieh	Sinchieh	新街
Xin-tai	Hsin-t'ai	Sintai	新泰

Appendix II.—*Continued.*

Pinyin	Wade-giles	"Conventional English"	Chinese
Xin-yu	Hsin-yü	Sinyu	新 喻
Xuan-cheng	Hsuan-cheng	Hsuancheng	宣 城
Yang-xi	Yang-hsi	Yangsi	洋 溪
Yang-xiao-wu	Yang-hsiao-wu	Yangsiaowu	杨小屋
Ye-ma-quan	Yeh-ma-chüan	Yehmachuan	野马泉
Yi-chang	I-ch'ang	Ichang	宜 昌
Yi-du	I-tu	I tu	宜 都
Yi-xi-bu-la-ke	- - -	- - -	依希布拉克
- - -	- - -	Yindirte	阴 德
Yong-le	Yung-le	Yunglo	永 乐
You-shan	Yu-shan	Youshan	油 山
Yu-huang-ding	Yu-huang-ting	Yuhuangting	玉皇顶
Yu-men	Yü-men	Yumen	玉 门
Yuan-qu	Yüan-chü	Yuanchu	垣 曲
Yun-nan (sheng)	Yün-nan (sheng)	Yunnan (province)	云南(省)
Zao-shi	Tsao-shih	Zhaoshih	枣 市
Zeng-bi-ling	Tseng-pi-ling	Changpiling	甑毕岭
Zeng-de-ao	Tseng-te-ao	Tsentean	增德垌
Zhai-li	Chai-li	Chaili	寨 里
Zhang-jia-wu	Chang-chia-wu	Changchiawu	张家屋
Zhang-shan-ji	Chang-shan-chi	Changshanchi	张山集
Zhu-ji	Chu-chi	Chuchi	珠 矶



Paleocene

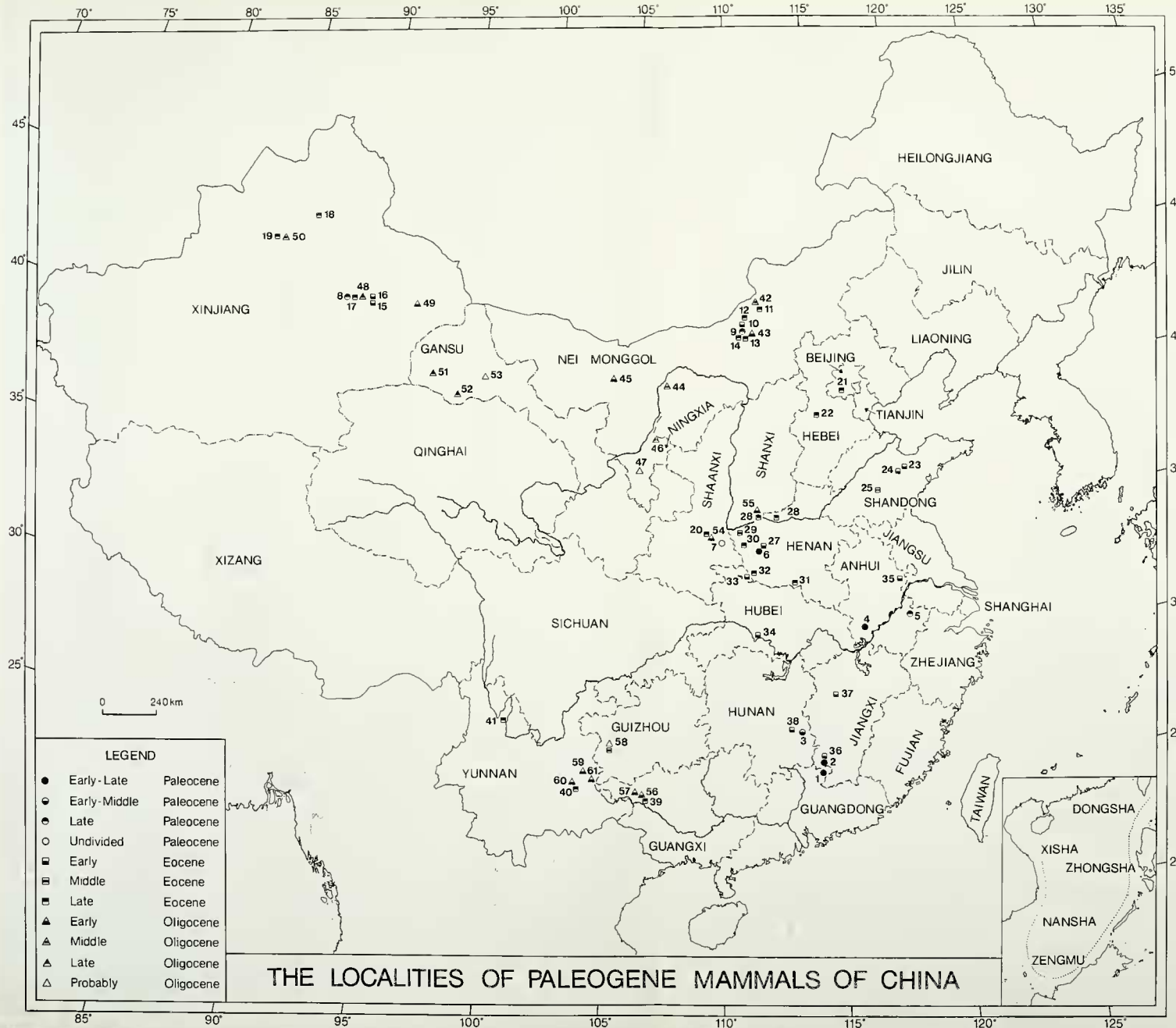
1. Nan-xiong (Nanhsiung): Shang-hu Fm., Nong-shan (Nungshan) Fm.
2. Chi-jiang (Chihkiang): Shi-zi-kou (Shihtzekou) Fm., Chi-jiang Fm.
3. Cha-ling: Zao-shi (Zhaoshih) Fm.
4. Qian-shan (Chienshan): Wang-hu-dun (Wanghutun) Fm., Dou-mu (Toumu) Fm.
5. Xuan-cheng (Hsuancheng): Shuang-ta-si (Shuangtassu) Gr.
6. Tan-tou: Gao-yu-gou (Kaoyukou) Fm., Da-zhang (Tachang) Fm.
7. Luo-nan: Shi-men.
8. Turpan (Turfan): Tai-zi-cun (Taitzetsun) Fm.
9. Nao-mu-gen (Nomogen): Nomogen Fm.

Eocene

10. Bayan Ulan: Bayan Ulan Fm.
11. Arshanto and Irdin Manha: Arshanto Fm., Irdin Manha Fm.
12. Camp Margetts: Irdin Manha Fm.
13. Shara Murun: Irdin Manha Fm.
14. Ula Usu: Shara Murun Fm.
15. Turpan: Da-bu (Tapu) Fm.
16. Turpan: Shi-san-jian-fang (Shihsanchienfang) Fm.
17. Turpan: Lian-kan (Lienkan) Fm.
18. Jung-gur (Dzungar): U-lun-gu Fm., Hong-li-shan Fm.
19. Jung-gur: Lu-se (Green) Fm.
20. Lan-tian: Hong-he (Hunghe) Fm.
21. Beijing (Peking): Chang-xin-dian (Changsintien) Fm.
22. Qu-yang (Chuyang): Ling-shan.
23. Wu-tu: Wu-tu Fm.
24. Niu-shan: Wu-tu Fm.
25. Xin-tai (Hsintai): Guan-zhuang (Kuanchuang) Fm.
26. Yuan-chu: He-ti (Hoti) Fm.
27. Tan-tou: Tan-tou Fm.
28. Ji-yuan (Chiyuan): Ji-yuan Fm.
29. Ling-bao (Lingpao): Chuan-kou Fm., Hun-shui-he (Hunshuiho) Fm.
30. Lu-shi (Lushih): Lu-shi Fm., Chu-gou-yu (Chukouyu) Fm.
31. Wu-cheng: Mao-jia-po (Maochiapo) Fm., Li-shi-gou (Lishihkou) Fm., Wu-li-dui (Wulitui) Fm.
32. Xi-chuan (Sichuan): Yu-huang-ding (Yuhuangting) Fm., Da-cang-fang (Tatsangfang) Fm., He-tao-yuan (Hotaoyuan) Fm.
33. Jun-xian (Chunhsien): Yu-huang-ding Fm., Da-cang-fang Fm.
34. Yi-chang (Ichang): Dong-hu (Tunghu) Fm.
35. Lai-an: Zhang-shan-ji (Changshanchi) Fm.
36. Chi-jiang: Ping-hu Fm.
37. Yuan-shui: Xin-yu (Sinyu) Gr.
38. Heng-yang: Ling-cha Fm.
39. Bo-se (Baise): Dong-jun (Tungchun) Fm., Na-duo Fm.
40. Lu-nan: Lu-mei-yi Fm.
41. Li-jiang (Likiang): Xiang-shan (Hsiangshan) Fm.

Oligocene

42. Houldjin: Houldjin Fm., Nao-gon-dai Fm. (in part).
43. Artyn Obo and Ulan Gochu: Artyn Obo Fm., Ulan Gochu Fm.
44. Deng-kou (Tengkow): Saint Jacques.
45. Hos-burd: Cha-gan-bu-la-ge Fm., Suhaitu.
46. Ling-wu: Qing-shui-ying (Chingshuiying) Fm.
47. Tong-xin (Tungsin) and Gu-yuan (Kuyuan).
48. Turpan: Tao-shu-yuan-zi (Taoshuyuantze) Fm.
49. Ha-mi: Ye-ma-quan (Yehmachuan).
50. Jung-gur: He-se (Brown) Fm.
51. Taben-buluk: Yinderte.
52. Shargaltein: Shih-chiang-tzu-ku and Wu-tao-ya-yu.
53. Shi-er-ma-cheng.
54. Lan-tian: Bai-lu-yuan (Pailuyuan) Fm.
55. Yuan-chu: Bai-shui-cun (Paishuitsun) Fm.
56. Bo-se: Gong-kang (Kung-kang) Fm.
57. Yong-le (Yunglo): Gong-kang Fm.
58. Gui-zhou (Kueichow): Oligocene or Eocene
59. Qu-jiang (Chuching): Cai-jia-chong (Tsaichiachung) Fm.
60. Lu-nan: Xiao-tun (Hsiaotun) Fm.
61. Luo-ping.

**Paleocene**

1. Nan-xiong (Nanhsiung): Shang-hu Fm., Nong-shan (Nungshan) Fm.
2. Chi-jiang (Chihkiang): Shi-zi-kou (Shihztekou) Fm., Chi-jiang Fm.
3. Cha-ling: Zao-shi (Zhaoshih) Fm.
4. Qian-shan (Chienshan): Wang-hu-dun (Wanghutun) Fm., Doumu (Toumu) Fm.
5. Xuan-cheng (Hsuancheng): Shuang-ta-si (Shuangtassu) Gr.
6. Tan-tou: Gao-yu-gou (Kaoyukou) Fm., Da-zhang (Tachang) Fm.
7. Luo-nan: Shi-men.
8. Turpan (Turfán): Tai-zi-cun (Taitzetsun) Fm.
9. Nao-mu-gen (Nomogen): Nomogen Fm.

Eocene

10. Bayan Ulan: Bayan Ulan Fm.
11. Arshanto and Irdin Manha: Arshanto Fm., Irdin Manha Fm.
12. Camp Margette: Irdin Manha Fm.
13. Shara Murun: Irdin Manha Fm.
14. Ula Ulu: Shara Murun Fm.
15. Turpan: Da-hu (Tapu) Fm.
16. Turpan: Shi-san-jian-fang (Shihsanchienfang) Fm.
17. Turpan: Lian-kan (Lienkan) Fm.
18. Jung-gur (Dzungar): U-lun-gu Fm., Hong-li-shan Fm.
19. Jung-gur: Lu-se (Green) Fm.
20. Lan-tian: Hong-he (Hungho) Fm.
21. Beijing (Peking): Chang-xin-dian (Changsin-tien) Fm.
22. Qu-yang (Chuyang): Ling-shan.
23. Wu-tu: Wu-tu Fm.
24. Niu-shan: Wu-tu Fm.
25. Xin-tai (Hsintai): Guan-zhuang (Kuanchungang) Fm.
26. Yuan-chu: He-ti (Hot) Fm.
27. Tan-tou: Tan-tou Fm.
28. Ji-yuan (Chiyuan): Ji-yuan Fm.
29. Ling-bao (Lingpao): Chuan-kou Fm., Hun-shui-he (Hunshuiho) Fm.
30. Lu-shi (Lushih): Lu-shi Fm., Chu-gou-yu (Chukouyu) Fm.
31. Wu-cheng: Mao-jia-po (Maochiapo) Fm., Li-shi-gou (Lishihkou) Fm., Wu-li-dui (Wulitui) Fm.
32. Xi-chuan (Sichuan): Yu-huang-ding (Yuhuangding) Fm., Da-cang-fang (Tatsangfang) Fm., He-tao-yuan (Hotaoyuan) Fm.
33. Jun-xian (Chunhsien): Yu-huang-ding Fm., Da-cang-fang Fm.
34. Yi-chang (Ichang): Dong-hu (Tungshu) Fm.
35. Lai-an: Zhang-shan-ji (Changshanchi) Fm.
36. Chi-jiang: Ping-hu Fm.
37. Yuan-shui: Xiu-yu (Sinyu) Gr.
38. Heng-yang: Lung-cha Fm.
39. Bo-se (Baise): Dong-jun (Tungchun) Fm., Na-duo Fm.
40. Lu-nan: Lu-mei-yi Fm.
41. Li-jiang (Likiang): Xiang-shan (Hsiangshan) Fm.

Oligocene

42. Houldjin: Houldjin Fm., Nao-gon-dai Fm. (in part).
43. Arlyn Obo and Ulan Gochu: Arlyn Obo Fm., Ulan Gochu Fm.
44. Deng-kou (Tengkow): Saint Jacques.
45. Hos-burd: Cha-gan-bu-la-ge Fm., Sahaatu.
46. Ling-wu: Qing-shui-ying (Chingshuiying) Fm.
47. Tong-xin (Tungsin) and Gu-yuan (Kuyuan).
48. Turpan: Tao-shu-yuan-zi (Taoshuyuantze) Fm.
49. Ha-mi: Ye-ma-quan (Yehmachuan).
50. Jung-gur: He-se (Brown) Fm.
51. Taben-buluk: Yinderte.
52. Shargaltein: Shih-chiang-tzu-ku and Wu-tao-ya-yu.
53. Shi-er-ma-cheng.
54. Lan-tian: Bai-lu-yuan (Pailuyuan) Fm.
55. Yuan-chu: Bai-shui-cun (Paishuitsun) Fm.
56. Bo-se: Gong-kang (Kung-kang) Fm.
57. Yong-le (Yunglo): Gong-kang Fm.
58. Gui-zhou (Kueichow): Oligocene or Eocene
59. Qu-ying (Chuching): Cai-jia-chong (Tsai-chia-chung) Fm.
60. Lu-nan: Xiao-tun (Hsiaotun) Fm.
61. Luo-ping.

